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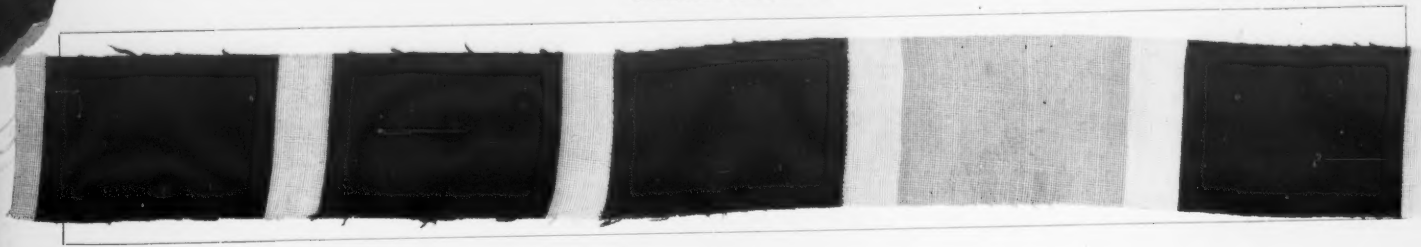
1879.

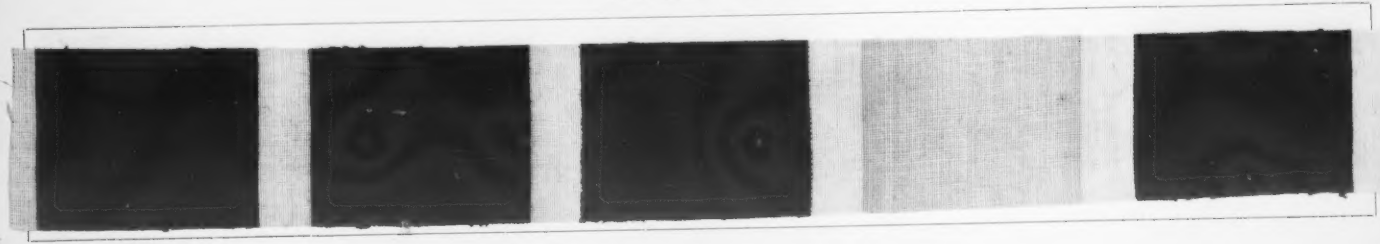
ANTHRAPURPURINE AND FLAVOPURPURINE ON FRENCH TEST CLOTH,

Illustrating Paper, by PREST. MORTON, in JOURNAL OF THE AMERICAN CHEMICAL SOCIETY : 1879.

ANTHRAPURPURINE.



FLAVOPURPURINE.



THE AMERICAN CHEMICAL SOCIETY.

XXIII.—Analyses of Air.

By WM. VAN SLOOTEN, C. E.

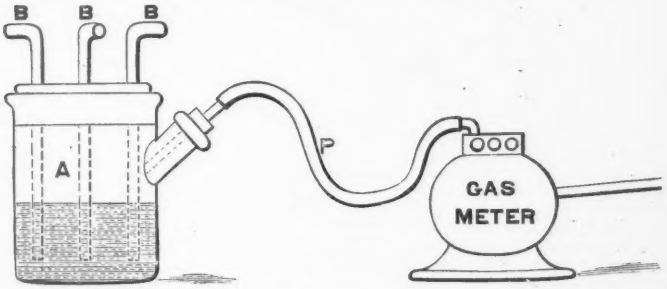
Received June 19, 1879.

During the epidemic of the past year, 1879, my attention was continuously attracted by the theories concerning the cause of yellow fever.

The germ theory seeming to possess the best grounds for belief, I resolved, if possible, to try and furnish some facts, either to throw doubts upon, or confirm the theory. The following "*a priori* reasoning" led me to investigate the condition of the atmosphere with reference to the amount of free and albuminoid ammonia, viz., if the atmosphere contains germs, they will consist principally of albumen, because all the lower forms, with which we are acquainted, do; therefore, by determining the amount of albuminoid ammonia in the atmosphere, during the epidemic, we have a measure of the organized matter; and, if the atmosphere, during an epidemic, contained more albuminoid ammonia than during a normal condition of health, it would have a tendency to confirm our belief in the germ theory of disease.

Through the kindness of Dr. Samuel Choppin, Prest. Board of Health, of this State (La.), the remains of the laboratory at the Charity Hospital School of Medicine, were placed at my disposal. After many failures in my experiments, for lack of apparatus, I managed to prepare such apparatus as enabled me to make satisfactory analyses.

The manner in which analyses were conducted, is as follows:



The bottle A was placed on the ground, or otherwise, in the place where we wished to determine the amount of ammonia in the

air; the bottle was then filled three-fourths full (which took ½ liter) with pure water (free from ammonia); it was connected by rubber tubing with a meter; the meter, in turn, with an aspirator; the aspirator was regulated to draw about 200 cub. feet of air per day through the water contained in the bottle; in order to insure that the air would come in contact with the water, through the stopper of the bottle A, numerous small glass tubes B B . . . , were inserted, aggregating in area much more than exit tube leading to meter through P.

The water in the bottle was carefully measured after each filtration of the air, and a correction made accordingly. The correction * was made in the following manner: If the bottle contained only 480 cc after a filtration, I added on one twenty-fourth of results found, for the free and albuminoid ammonias.

The amount of free and albuminoid ammonia was determined by means of Wanklyn, Smith & Chapman's ammonia process. The results I tabulated, so that they might be compared with those of R. Angus Smith, *vide* "Air and Rain."

Date.	Grains per Million Cubic Feet.	
	free ammonia.	albuminoid ammonia.
Sept. 9	125.62	350.56
" 10	100.05	371.21
" 11	82.00	382.19
" 18	79.56	376.82
" 19	95.66	400.75
" 20	98.06	360.80
" 21	102.25	345.76
" 22	82.72	325.78
" 23	92.05	328.72
" 24	112.26	300.42
" 25	78.20	285.62
" 26	115.06	312.92
" 27	103.07	314.62
" 28	96.78	325.08
" 29	103.05	300.20
" 30	100.25	250.96

* The method of correction was adopted from results obtained in twenty duplicate analyses, as, for instance: through two bottles at the same time we filtered the air; through one bottle we drew 225 cubic feet, and the other 200; we found on measuring the water in the two bottles that it varied, and by making the correction mentioned in the article, the amount of ammonia was found to be the same in both instances when reduced to grains per million cubic feet, to within a fraction of a grain.

The amount of water evaporated in the bottles seemed to be in direct relation to the amount of air drawn through the water, and also to amount of moisture in the air.

The greater the amount of air filtered, the greater the amount of water evaporated; the drier the air, the greater the amount of water evaporated. The amount of water evaporated rarely exceeded 10 cc.

Date.	Grains per Million Cubic Feet.	
	Free Ammonia.	Albuminoid Ammonia.
Oct. 1	76.02	275.23
" 2	70.25	206.05
" 3	68.70	198.33
" 4	74.09	150.42
" 5	63.92	125.05
" 6	78.82	150.02
" 7	92.74	125.67
" 8	100.86	105.82
" 9	125.92	150.32
" 10	103.33	175.06
" 11	92.88	162.73
" 12	92.07	165.22
" 13	90.02	154.21
" 14	98.62	160.02
" 15	92.08	168.06
" 16	105.30	200.32
" 17	102.06	250.32
" 18	107.45	292.08
" 19	102.01	300.67
" 20	125.66	290.62
" 21	120.02	230.04
" 22	118.56	226.05
" 23	112.06	203.05
" 24	111.56	201.03
" 25	90.06	225.76
" 26	85.67	203.03
" 27	83.04	180.16
" 28	85.09	170.22
" 29	89.70	162.00
" 30	76.22	150.02
" 31	70.06	147.22
Nov. 1	82.42	142.07
" 2	79.23	120.78
" 3	76.79	110.22
" 4	60.05	92.07
" 5	56.62	85.66
" 6	50.64	84.75
" 7	40.40	75.00
" 8	32.07	62.06
" 9	32.09	61.80
" 10	31.00	61.02
" 11	31.67	60.72
" 12	32.66	55.66
" 13	33.00	53.04
" 14	34.06	52.63
" 15	35.66	48.60
" 16	34.03	44.55
" 17	31.68	46.87

Date.	Grains per Million Cubic Feet.	
	free ammonia.	albuminoid ammonia.
" 18	27.32	43.66
" 19	23.02	56.52
" 20	26.24	55.03
" 21	27.45	52.90
" 22	24.00	49.60
" 23	23.22	48.07
" 24	23.31	47.25

In the above analyses the air was filtered at 42 S. Derbigney St., the yellow fever prevailing during the months of Sept. and Oct.; the bottle was placed upon the ground.

The following are a few analyses made by filtering the air in the yard of the Charity Hospital School of Medicine; the bottle was placed on the ground:

Date.	Grains per Million Cubic Feet.	
	free ammonia.	albuminoid ammonia.
Sept. 18	130.06	325.62
" 19	95.00	326.22
" 20	98.62	315.34
" 30	100.15	290.02
Oct. 15	83.04	256.05
" 22	100.30	268.09
" 23	105.67	240.83
" 25	88.32	235.06
Nov. 1	60.02	180.72
" 3	58.86	156.70
" 16	40.72	55.02
" 18	35.93	48.67

The following are determinations made from air filtrations, made on the roof of the Charity Hospital School of Medicine:

Sept. 19	38.62	86.42
" 25	38.42	76.02
" 30	39.42	88.46
Oct. 5	30.24	72.08
" 10	24.02	56.04
" 15	28.82	64.57
" 25	35.22	64.25
" 31	24.46	52.65
Nov. 3	23.39	48.65
" 10	28.02	43.02

The inferences that I draw from the above analyses regarding the condition of the atmosphere, are as follows:—1st. That the air was abnormally charged with albuminoid ammonia during the epidemic. 2d. That the abnormality disappeared with the fever. 3d. That the atmosphere not in immediate connection with the ground, was comparatively free from any abnormal variations from an average standard.

Ozone.

The ozone test papers were prepared in the following manner: A solution was made containing

Iodide of potassium	1 gramme.
Starch	5 "
Water	400 cc.

Fine Swiss filter paper was then thoroughly soaked in the above solution, in the dark, then carefully dried and cut into strips 3 in. × 1 in., and these were placed in black bottles and carefully protected from light and air until needed.

Other ozone test papers were also made by soaking the paper in a solution of

Iodide of potassium	2 grammes.
Water	200 cc.

The next step was the preparation of the standards with which to compare the effects produced on the ozone papers when exposed to the air. Ozone was generated in a small gasometer filled with air, by means of an electrical machine. On making an analysis of the ozone contained in the air of the gasometer, I found that the air contained 1½ grains of ozone per 100 cubic feet at a temperature of 60° F. and barometer 30.09 inches; the ozone was determined by passing the ozonized air through a standardized solution of iodide of potassium, containing a little hydrochloric acid, then determining the iodine freed, as indicated by the following formula:

$$O_3 + 2KI + H_2O = 2KHO + O_2 + I_2.$$

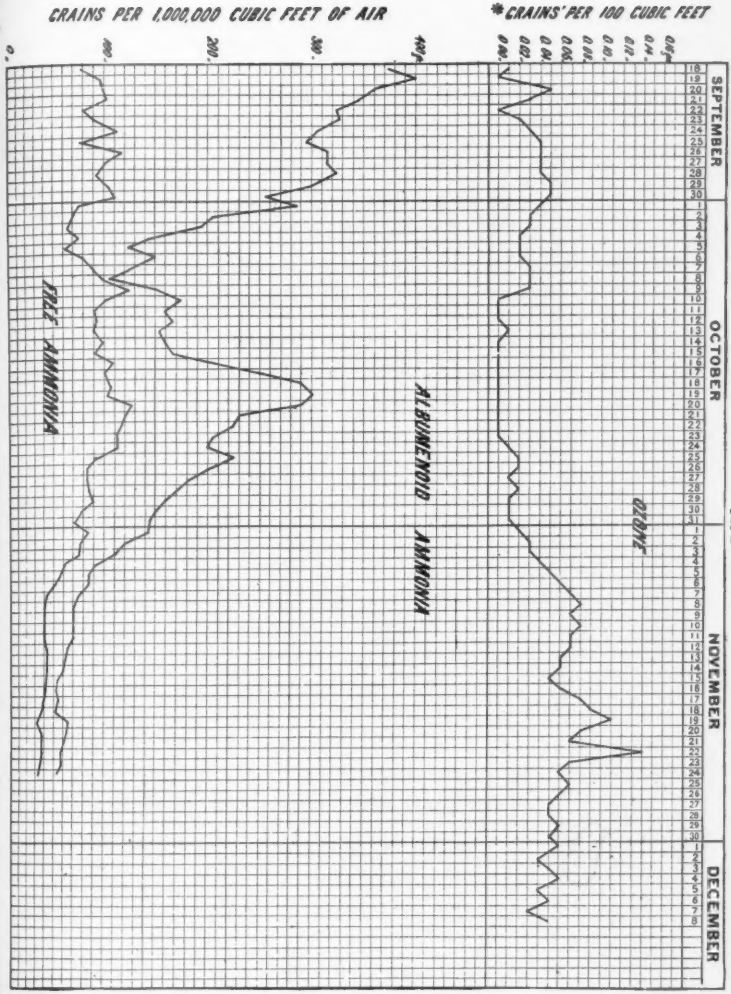
The ozonized air was passed into a glass measure, and from thence transferred to jars containing known quantities of air, and mixtures were made which contained, at 60° F. and 30.09 bar., the following quantities of ozone:

Sample No.	1	0.02	of a grain per	100 cub. ft.
" "	2	0.04	"	"
" "	3	0.06	"	"
" "	4	0.08	"	"
" "	5	0.10	"	"
" "	6	0.12	"	"
" "	7	0.14	"	"
" "	8	0.16	"	"
" "	9	0.18	"	"
" "	10	0.20	"	"

Slips of ozone papers (both wet and dry) were exposed for half an hour to the above mixtures, and these were the standards with which I compared the action of the ozone on the test papers exposed to the air. The reasons why I adopted the above standards are, that on Jan. 15th and Feb. 18th, 1878, during electrical storms, I made

quantitative determinations of ozone in the atmosphere, and found 0.10 of a grain per 100 cubic feet, and 0.13 of a grain, respectively. I then, every day, commencing on Sept. 18th, 1878, exposed three ozone papers to the action of the atmosphere for twenty-four hours (viz., 1 iodide of potassium without starch and 2 with starch, one kept dry and the other moist); these were protected from direct sunlight. They were then compared with the standards, with the following results (which are the mean of the three papers):

DATE.	GENERAL CONDITION OF ATMOSPHERE.	OZONE.
Sept. 18	Fair	½
" 19	Cloudy	—
" 20	"	2½
" 21	"	1½
" 22	"	—
" 23	Fair	1
" 24	"	1½
" 25	"	2
" 26	"	2
" 27	"	2
" 28	"	2
" 29	"	2½
" 30	"	2½
Oct. 1	Rainy	2
" 2	Fair	1½
" 3	"	1½
" 4	"	1
" 5	Rain	1
" 6	Fair	1
" 7	"	1
" 8	"	1½
" 9	Rain	1½
" 10	Cloudy	—
" 11	Fair	—
" 12	"	—
" 13	"	½
" 14	"	—
" 15	Cloudy	—
" 16	"	—
" 17	Fair	—
" 18	"	—
" 19	"	—
" 20	"	—
" 21	"	—
" 22	"	—
" 23	"	—
" 24	"	½
" 25	"	1
" 26	"	1



* The ozone curve shows merely the relative effects produced on the ozone test papers when exposed to the atmosphere, as compared to the effects produced by known quantities of ozone.

DATE.	GENERAL CONDITION OF ATMOSPHERE.	OZONE.
Oct. 27	Fair	½
" 28	Cloudy	1
" 29	Fair	1½
" 30	"	½
" 31	"	½
Nov. 1	"	1
" 2	"	1½
" 3	"	1½
" 4	"	2
" 5	"	2½
" 6	"	3
" 7	"	3½
" 8	"	4
" 9	"	3½
" 10	Cloudy	4
" 11	Rainy	3½
" 12	Cloudy	3½
" 13	Very Rainy	3
" 14	Fair	3
" 15	"	2½
" 16	Cloudy	3
" 17	Rainy	4
" 18	Very Rainy	4½
" 19	Rainy	5½
" 20	Fair	4
" 21	"	3½
" 22	"	7
" 23	"	3½
" 24	"	3
" 25	Very Rainy	3½
" 26	Rainy	3
" 27	Fair	2½
" 28	"	2½
" 29	"	3
" 30	"	2½
Dec. 1	Rain	3
" 2	Fair	2
" 3	"	2½
" 4	"	3
" 5	"	2½
" 6	"	3
" 7	Rain	1½
" 8	"	2½

The ozone papers were exposed near the ground and on the roof, about 20 feet from the ground, but difference of position seemed to have no effect. The only inference that I draw from the above data is, that with increase of ozone, albuminoid ammonia fell off. This is best shown by the accompanying curves.

New Orleans, Feb. 20, 1879.

Abstracts from American and Foreign Journals.

Bulletin de la Société Chimique de Paris.

Abstractor, E. H. S. BAILEY, PH. B.

Vol. XXXI, No. 1, Jan. 5, 1879.

On Some Mineral Waters of Auvergne, ED. WILLM.—The method of analysis of the waters of Royat, Saint-Nectaire and Châtel-Guyon, is described in detail, special attention being paid to the determination of carbonic acid, lithium and arsenic. Results are given for waters taken from several different sources in each case.

On the Transformation of Starch into Glucose by Cold Water, J. RIBAN.—It has been previously demonstrated that starch is changed to glucose by the action of boiling water. The author finds that a salted and filtered solution of starch gradually becomes less sensitive to iodine, till at the end of three or four years it ceases to be acted upon by that reagent. It is proved to be a mixture of dextrine and glucose, mostly the latter, and to contain no organized ferment.

Determination of the Density and of the Coefficients of Expansion of Solution of Chloride of Methyl, CAMILLE VINCENT and DELACHANAL.—In making these determinations the method of Isidore Pierre has been followed. The density is given from —30° to + 50°. The coefficients of expansion obtained in the ordinary formula, $Vt = Vo\ (1 + \alpha t + \beta t_2 + \gamma t_3)$, are $\alpha = 0.00193929$; $\beta = 0.00000183121$; $\gamma = 0.000000105916$.

Note upon the Article of E. and O. Fischer, in Reference to the Constitution of Rosaniline,* A. ROSENSTIEHL.—A review. The author referring to previous researches of his own upon the same subject,† differs somewhat in his conclusions from Messrs. Fischer. It is assumed, without proof, that the two molecules of toluidine supposed to exist in combination with one molecule of aniline, are both orthotoluidine, while in reality they are para and orthotoluidine. Again, it may be proved, contrary to the opinion of the authors, that rosaniline may exist in isomeric forms.

Determination of Carbon in Steel by Eggertz's Method, V. DESHAYES.

* Bull. Soc. chim., **30**, 383.

† *Idem*, **11**, 301.

Idem, No. 2.

Preparation and Properties of Cobaltocyanide of Potassium and its Derivatives, A. DESCAMPS. — To an artificially cooled solution of chloride of cobalt is gradually added a cold solution of potassic cyanide, guarding against excess. A reddish-brown precipitate is produced, which is washed in a cold place with cold water. The precipitate is placed in a vessel and a slight excess of the above solution of potassic cyanide is added, when a dark green precipitate is formed. The crystals may be washed with alcohol and kept for some time in this medium, but they have a constant tendency to change from cobaltocyanide to cobalticyanide. Several other salts of cobaltocyanhydric acid were made, but the tendency to change with the slightest elevation of temperature has thus far precluded an analysis.

On the Curve of Solubility of Salicylic and Benzoic Acids, EDME BOURGOIN. — The curves of solubility of these acids in water at temperatures from 0° to 100°, were determined by a series of careful experiments. As far as 35° the curves of the two acids nearly coincide, and are parabolas; above that temperature, in accordance probably with some physical modification which takes place in the molecule under the influence of heat, they do not coincide so well, but are modified in a similar manner. At the temperature of 40° the solubility of the two acids is exactly the same and the curves cross. A general law in reference to the solubility of organic bodies may some time be formulated by the study of such curves.

Note upon the Carminaphte of Laurent, ANTHONY GUYARD.—A reliable method of making this mysterious body is announced. One equivalent, or about 128 gms of naphthalene are dissolved in a sufficient quantity of crystallizable acetic acid. To this is gradually added, heating slightly, a solution of chromic acid dissolved in the same way, containing 12 equivalents, or about 600 gms of CrO_3, and the mixture is boiled for a few minutes. By saturating with an alkali and acidulating the solution again, a reddish-brown precipitate of carminaphte is thrown down.

Oxidation of Diallyl, and on the Hexylic Glycol which is Derived from it, B. SOROKINE. — If diallyl be acted upon by bichromate of potash and sulphuric acid, the only products of the reaction are carbonic anhydride and acetic acid. The glycol does

not furnish any clue to the constitution of diallyl, as by its oxidation carbonic anhydride and acetic acid are the only volatile products.

Idem, No. 3.

Researches upon Strychnine, H. GAL and A. ETARD.—By acting upon strychnine with baric hydrate in a closed tube at a temperature of 135–140°, and precipitating the baryta with carbonic anhydride, by crystallizing, a new hydrate, called dihydrostrychnine, is formed:

$$C_{21}H_{22}N_2O_2 + 2H_2O = C_{21}H_{26}N_2O_4.$$

From the mother liquor trihydrostrychnine is obtained:

$$C_{21}H_{22}N_2O_2 + 3H_2O = C_{21}H_{28}N_2O_5.$$

On Succinic Fermentation, PIERRE MIGUEL.—Experiments prove that pure asparagine, if protected from the germs of the atmosphere, will remain unaltered for a long time. If, however, it is exposed to unfiltered air or to a drop of common water, it will ferment. This change is produced by a species of bacteria. Nearly all the nitrogen of the asparagine is changed to ammonia in eight or ten days. A constant supply of air is necessary to the growth of this ferment, the action being similar to the oxidation of alcohol by the *mycoderma aceti.*

Dextrogyric Amylic Alcohol, J. A. LE BEL.—A continuation of a discussion in reference to the action of mould in changing the polarity of amylic alcohol.

On the Action of Diastase, of Saliva and of the Pancreatic Juice on Starch and Glycogen, F. MUSCULUS and J. DE MERING.—(See JOUR. AMER. CHEM. SOC., Vol. I, No. 5, p. 173.)

Methylaniline, Methyltoluidine, and Coloring Matters Derived from them, P. MONNET, F. REVERDIN and E. NOELTING.

I.

To obtain monomethylaniline, methyl alcohol, aniline and hydrochloric acid are heated to 200°, and the product, after being made alkaline, is distilled. The methylaniline thus obtained is then mixed with hydrochloric acid and water, and gradually treated with a cold solution of nitrite of soda. This changes the aniline to chloride of diazobenzol, the dimethylaniline, to chlorhydrate of nitrosodimethylaniline, which remains in solution, while the monomethylaniline

changes to nitrosomethylphenylamine, which separates as a yellowish oily substance. The reactions are represented thus:

$$(1.)\quad \left.\begin{matrix}C_6H_5\\H\\H\end{matrix}\right\}N.HCl + HNO_2 = C_6H_5N{=}NCl + 2H_2O$$

$$(2.)\quad \left.\begin{matrix}C_6H_5\\CH_3\\CH_3\end{matrix}\right\}N.HCl + HNO_2 = \left.\begin{matrix}C_6H_4(NO)\\CH_3\\CH_3\end{matrix}\right\}N.HCl + H_2O$$

$$(3.)\quad \left.\begin{matrix}C_6H_5\\CH_3\\H\end{matrix}\right\}N + HNO_2 = \left.\begin{matrix}C_6H_5\\CH_3\\NO\end{matrix}\right\}N + H_2O$$

As soon as nitrous acid ceases to be absorbed, ether is added, the residue dried and evaporated. This is methylphenylnitrosamine. The nitrosamine is reduced with tin and hydrochloric acid, and the product of the reaction, after being treated with soda, is distilled with water, and the monomethylaniline is decanted off. The purified product boils at 192°.

II.

Dimethylaniline, $\left.\begin{matrix}C_6H_5\\CH_3\\CH_3\end{matrix}\right\}N$, is obtained from the commercial product by changing it to chloride of trimethylphenyl ammonium, and subjecting to dry distillation. It boils at 192°.

III.

Monomethylorthotoluidine, $\left.\begin{matrix}C_7H_7\\CH_3\\H\end{matrix}\right\}N$, is prepared by the reduction of methylorthocresylnitrosamine. Boiling point, 207–208°.

IV.

Dimethylorthotoluidine, $\left.\begin{matrix}C_7H_7\\CH_3\\CH_3\end{matrix}\right\}N$, is made by heating under pressure for two days at 200–220°, orthotoluidine, methyl alcohol and hydrochloric acid. The residue is distilled with water, and the dimethylorthotoluidine passes over at 182–184°.

V.

Monomethylmetatoluidine, $\left.\begin{matrix}C_7H_7\\CH_3\\H\end{matrix}\right\}N$, is made by treating metatoluidine with iodide of methyl; the reaction being as follows:

$$2C_6H_4CH_3NH_2 + ICH_3 = C_6H_4CH_3N\left\{\begin{matrix}CH_3\\H\end{matrix}\right. + C_6H_4CH_3NH_2HI.$$

From the product of this reaction the meta compound is indirectly obtained. It boils at 206–207°.

VI.

Dimethylmetatoluidine, $\left.\begin{matrix}C_7H_7\\CH_3\\CH_3\end{matrix}\right\}$ N, is obtained by treating metatoluidine with iodide of methyl, in the presence of an alkali, and the etheral solution yields the pure base. It boils at 206–208°.

VII.

Monomethylparatoluidine, $\left.\begin{matrix}C_7H_7\\CH_3\\H\end{matrix}\right\}$ N, is prepared by Thomsen's method, or the method described by the authors for the preparation of monomethylaniline, may be followed.

VIII.

Dimethylparatoluidine, $\left.\begin{matrix}C_7H_7\\CH_3\\CH_3\end{matrix}\right\}$ N, may be prepared by several methods.

The products of oxidation of these aniline and toluidine compounds, and the coloring matters thus obtained, are discussed and arranged in tabular form.

On the Serpentine of Venayes (Vallée d'Aoste), ALFONSO COSSA.—The result of the analysis is as follows:

Silica	40.86
Phosphoric anhydride	trace.
Magnesia	41.37
Oxide of Iron	4.59
" Chromium	0.03
" Nickel	0.09
Lime	0.03
Oxide of Manganese	trace.
Water	13.08

Idem, No. 4.

Synthesis of Uric Derivatives of the Alloxan Series, EDOUARD GRIMAUX.—By the action of oxichloride of phosphorus upon a mixture of malonic acid and urea, malonylurea, or barbituric acid, is formed. This may be represented thus:

$$3C_3H_4O_4 + 3CON_2H_4 + 2POCl_3 = 3C_4H_4N_2O_3 + 2PO_4H_3 + CHCl.$$

A variety of characteristic derivatives have been made. Thionurate of ammonia [$C_3H_4N_2SO_6(NH_4)_2$] is prepared by acting upon the nitrous derivative with sulphate of ammonia; and amidomalonylurea ($C_4H_3NH_2N_2O_3$), by reducing the former by means of chloride of tin. Alloxantine is made by treating dibromomalonylurea ($C_4H_2Br_2N_2O_3$) with hydric sulphide. This can be changed into alloxan ($C_4H_2N_2O_4$) by adding twice its weight of water and heating to solution with a few drops of nitric acid. Murexide is obtained by treating amidomalonylurea with red oxide of mercury. If tartronic acid ($C_4H_4O_5$) be treated with urea and oxichloride of phosphorus, oximalonylurea is probably obtained, as the product gives a characteristic color by successive treatment with nitric acid and ammonia.

On Amalgams of Chromium, Iron Cobalt, Nickel and Manganese, and on a New Process for the Preparation of Metallic Chromium, H. MOISSAN.—Chromium amalgam is made by acting upon sodium amalgam by solution of protochloride of chromium. This amalgam, heated in a current of hydrogen, gives metallic chromium. An amalgam of manganese is made by decomposing a solution of protochloride of manganese, in the presence of a negative electrode of mercury, by means of a battery. Amalgams of iron, cobalt and nickel, can also be prepared, and from them the pure metals can be reduced.

Analysis of some Metallic Fragments taken from Peruvian Sepulchres at Apcon, near Lima, A. TERREIL.—These analyses were undertaken with the idea that some light might be thrown upon the condition of metallurgy in this country in the sixteenth century. It will be noticed that the first sample contained chlorine. There was much sea sand in the locality where this metal was found. The analyses are as follows:

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Silver	77.04	33.35	17.27	—	trace.
Gold	trace.	5.42	—	—	—
Copper	7.06	60.83	79.03	65.90	94.35
Zinc	—	—	—	32.04	—
Iron	—	—	—	1.05	—
Chlorine.	15.71	0.22	2.31	trace.	trace.
Oxygen, sulphur, arsenic, carbonic acid, etc., undet.	0.19	0.18	1.39	1.01	5.53
Quartz sand	—	—	—	—	0.12
	100.00	100.00	100.00	100.00	100.00

No. 1 is a definite alloy $\frac{916}{1000}$ fine. Nos. 2 and 3 are not definite alloys; small quantities of silver and gold present in some of these, is probably due to the presence of these metals in the ores. No. 4 is a sample of brass similar to that used at the present day. As zinc is not found in Peru, it must have been imported from Europe by the Spaniards.

A New Determination of the Chemical Equivalent of Aluminum, A. TERREIL.

Note upon the Presence of Nitriles in the Pyrogenous Products obtained from the Residue from the Industrial Treatment of Beet Roots, CAMILLE VINCENT.—In addition to methyl alcohol and acetonitrile, previously announced, the author has since detected the presence of propionitrile, butyronitrile and valeronitrile, and has made the corresponding acids and salts.

On the Camphor of Borneo.—A claim of priority, J. RIBAN.

On the Nature of Certain By-products obtained in the Industrial Treatment of Pennsylvania Petroleum, L. PRUNIER and R. DAVID. — In the material originally obtained from Dr. Tweddle, of Pittsburg, it is found that the products of fractional distillation (petrocene, carbocene, carbopetrocene and thallene) are not definite compounds, but only mixtures. By acting upon them with different solvents, they may be resolved into a series of hydrocarbons. Anthracene, phenanthrene, chrysene and other bodies obtained in the distillation of coal, have been noticed, indicating a parallel series, with, perhaps, some new terms.

On the Formation of Organic Ultramarines, DE FORCRAND.—In continuation of the subject previously discussed,* ultramarines of sodium, potassium, barium, magnesium, zinc lithium and rubidium have been prepared. The process is simply to heat an intimate mixture of a metallic chloride and silver ultramarine for some time under regulated conditions. Ultramarines of organic radicals have also been prepared by treating in a similar manner; silver ultramarine with iodide of ethyl, for instance. The products gave off sulphide of ethyl upon being heated, but if chloride of sodium was mixed with it previous to heating, it was changed to ordinary blue ultramarine. Similar results were obtained by treating silver ultramarine with iodide of allyl, iodide of amyl, chloride of benzyl, &c. The characteristics of the bodies thus obtained are similar to those of ordinary ultramarine.

* Bull. Soc. Chim., **30**, p. 112.

On the Relation Existing between the Chemical Composition and the Mechanical Properties of Steels, V. DESHAYES, Eng. at Terre-Noire.—Not suitable for abstraction. An elaborate article, giving complete details in regard to this important subject.

Idem, No. 5.

Note upon a Recent Work of M. B. Aronheim, P. SCHUTZENBERGER.

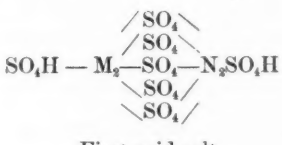
On the Chlorostannates of the Rare Earths, P. T. CLEVE.—The following have been prepared:

$2La_2Cl_6$, $5SnCl_4$, $45H_2O$.
Ce_2Cl_6, $2SnCl_4$, $18H_2O$.
Di_2Cl_6, $2SnCl_4$, $21H_2O$.
Y_2Cl_6, $2SnCl_4$, $16H_4O$.

The composition of the chlorostannates is thus shown to be perfectly analogous to that of the chloroplatinates.

Researches upon Sulphates, A. ETARD.—Most mixed sesquisulphates can be represented by the general formula $M_2(SO_4)_6N_2$. Only one salt of the type, $2[M_2(SO_4)_3]N_2(SO_4)_3$, has been observed. According to the theory of the author, by heat the acid salt changes as follows:

Neutral Salt.



First acid salt.

Second acid salt.

Some of the salts made are:

Acid double sulphate of iron and alumina—
$[Al_2(SO_4)_6Fe_2\ SO_4H_2]$.

Acid sesquisulphate of iron and chromium—
$[Cr_2(SO_4)_6Fe_2\ SO_4H_2]$.

Sesquisulphate of aluminum and manganese—
$2[Al_2(SO_4)_3]Mn_2(SO_4)_3$.

On the Heat Disengaged by Combining Carbonic Oxide with Other Bodies, M. BERTHELOT.—Carbonic oxide is studied in reference to its combination with oxygen, chlorine and sulphur.

On the Specific Heat and Heat of Fusion of Gallium, BERTHELOT.—An ingot of 34 grammes was experimented with. The specific heat of liquid gallium is 0.0802; of the solid, 0.089. The heat of fusion may be determined by plunging some crystals into the melted gallium. The mass immediately crystallized, and the evolved heat was measured at 13°, and it is sensibly the same between 0° and 30°; the mean was + 19.11 units. The atomic weight, as determined by L. Boisbaudran, is 69.9, hence we have the products, $69.9 \times .0802 = 5.59$ for the liquid, and $69.9 \times .079 = 5.52$ for the solid. These numbers, it will be noticed, agree well with the determinations of aluminum and glucinum already made.

Reciprocal Displacement between Weak Acids, BERTHELOT.—Two weak acids in contact with a base, cause a decomposition, this being regulated by the partial state of decomposition of each of the two salts considered separately, which depends in turn on the proportion of water and of the corresponding acid. When a salt of such an acid comes in contact with an acid opposed to it, decomposition by water takes place in proportion as the quantity of the base existing free in the solution, is saturated by the other acid; and that to just such an extent as there is equilibrium between the two salts and the water which tends to decompose each of them. The total thermic effect is then the resultant of these two phenomena, namely: a disengagement of heat due to the combination of the acids with the free base (chemical energy), and an absorption of heat due to the decomposition produced by solution.

On the Rotatory Power of Styrolene, BERTHELOT.—Some confusion seems to result from the indiscriminate use of styrol as applied to the volatile oil, and to the purified hydrocarbon $C_{16}H_8$. Care should be exercised to distinguish this latter, which, of itself, has a definite rotatory power as styrolene.

Idem, No. 6.

On the Determination of Total Nitrogen in Fertilizers, A. RÉMONT.

Manufacture of Crystallized Chromate of Baryta, LÉON BOURGEOIS.—The method consists in melting together two equivalents of chloride of barium with one equivalent of potassic chromate, and one equivalent of sodic chromate, and cooling slowly, and finally

dissolving out the chlorides from the mass with hot water. The crystals of neutral chromate of baryta thus obtained, consist of right prisms with a rhombic base, and their color varies between yellow and green.

On some of the Hydrocarbons that are formed by the Action of Chloride of Methyl upon Toluene in the Presence of Chloride of Aluminum, E. ADOR and A. RILLIET.—Some of the conclusions reached, are: 1st. In reference to xylenes; these contain only a very small quantity of orthoxylene, and by the action of chloride of methyl upon benzine in the presence of chloride of aluminum, the product is almost entirely isoxylene mixed with a little paraxylene.

2d. In reference to trimethyl benzines, pseudocumene is formed on account of the presence of metaxylene, in greater proportion than mesitylene. The small quantity of paraxylene found is not sufficient of itself to account for the presence of so large a proportion of pseudocumene as is found. The absence of a third trimethyl benzine as well as of orthoxylene, as has been previously shown, points to the possible fact that these bodies are more liable to react with chloride of methyl, and to be very quickly transformed into pentamethyl and hexamethyl derivatives.

3d. In reference to tetramethyl benzines, it is noted that the unknown bodies sought were not obtained, but it is proposed to make them by other methods.

Bromocitraconic Acid, EDME BOURGOIN.—Dibromopyrotartaric acid may experience two modes of decomposition. 1st. Boiled for some time with an alkaline solution, it loses carbonic acid and forms, as M. Cahours has shown, an isomeric form of dibromobutyric acid:

$$C_{10}H_6Br_2O_8 - C_2O_4 = C_8H_6Br_2O_4.$$

2d. Treated in the cold with oxide of silver, it loses one molecule of hydrobromic acid, and becomes bromocitraconic acid:

$$C_{10}H_6Br_2O_8 - HBr = C_8H_5BrO_8.$$

The acid described by M. Cahours, and bromocitraconic acid, are both readily decomposed, the first parting with hydrobromic acid, and the second with carbonic acid; each then becomes the same body, namely, the bromocrotonic acid described by M. Kekulé.

On the Relative Affinities and Reciprocal Displacement of Oxygen and of the Halogen Elements, BERTHELOT.—This theory is elucidated in a very careful and complete manner. It is shown that the order of affinity and of reciprocal displacement of the halogens and oxygen, either united to metals or metalloids, can be foretold, if determinations have been made of the quantities of heat dis-

engaged in the formation of the combinations of the metals and metalloids with oxygen and with the halogens. The demonstration depends partly upon the numerical comparison of quantities already known to science, and partly upon the determinations made by the author in regard to the heat of formation of bromides and iodides of alumina, tin, arsenic, &c. By comparing the reactions of the halogens and oxygen upon the different metals, it will be seen that the reciprocal displacements between iodine and oxygen particularly, do not depend on type or atomic formula. The quantity of heat disengaged by the combination of each metal with the element, taken in equivalent weight, is the key to the order of reciprocal displacement. If the heat disengaged in formation is known, the qualities of the reaction will be known, provided, of course, that the appropriate state of existence, solid, liquid, &c., is known, and the degree of stability or dissociation belonging to the body at each temperature.

American Chemical Journal.

Vol. I, Nos. 2 and 3.

Abstractor, J. P. BATTERSHALL, PH. D.

I. Determination of Nitrogen in the Analysis of Agricultural Products, S. W. JOHNSON and E. H. JENKINS.

II. On a Method for the Determination of Phosphoric Acid, by the same.

The above papers are noticed elsewhere.

III. Examination of the North Carolina Uranium Minerals, F. A. GENTH.—In this paper the mineralogical and chemical character of several of the uranium minerals previously mentioned by Prof. W. C. Kerr (Am. Jour. Sc. [3], xiv, 496), is described. The minerals examined were obtained from the Flat Rock mine, Mitchell Co., N. C. The following are the results of the author's investigation:

Uranotil occurs as a pale yellow coating, surrounding the gummite. The N. C. variety is amorphous; H=2.5; Sp. g.=3.834; sol. in HCl. The analysis gave figures nearly corresponding to the formula $Ca_3(UO_2)_6Si_6O_{21}+18H_2O$.

Gummite occurs in amorphous nodular masses; H=3; Sp. g.=4.840; color, yellow to orange-red; sol. in acetic acid. The author regards the mineral as principally a calcic uranate ($CaO.2U_2O_3+6H_2O$),

resulting from the alteration of uraninite. The N. C. variety is a mechanical mixture of uranic hydrate, uranotil, lead-uranate and barium-uranate.

Phosphuranylite (a new species) forms pulverulent incrustations upon quartz, feldspar and mica, consisting of minute rectangular scales (rhombic?); color, lemon-yellow; soluble in HNO_3; free from arsenic acid. The analysis gave results agreeing with the formula $(UO_2)_3P_2O_8+6H_2O$.

IV. Researches on the Substituted Benzyl Compounds, C. LORING JACKSON.—The author, after noting the researches of previous investigators on benzyl compounds, proceeds to describe the preparation and properties of certain substituted benzyl bromides.

Parabrombenzyl bromide ($C_6H_4^{p}Br.CH_2Br$) was prepared by heating parabromtoluole with gradual addition of bromine, also by treating benzyl bromide in the cold with bromine, to which a little iodine had been added. It is easily soluble in hot alcohol, but slightly in cold, from which it is deposited in thick, colorless needles having a brilliant lustre; melts at $61\frac{1}{2}°$, and, upon oxidation with potassic dichromate and sulphuric acid, is converted into parabrombenzoic acid, the reaction being attended with flashes of light.

Metabrombenzyl bromide ($C_6H_4^{m}Br.CH_2Br$) was obtained from metabromtoluole (prepared by Wroblevsky's method, Ann. der Chem., **168**, p. 153) in a similar manner as the para-compound. When crystallized from alcohol, it forms white bladed plates, arranged in radiated groups; it withstands the action of potassic dichromate and sulphuric acid; the alcohol derived from it is, however, converted by this mixture into metabrombenzoic acid.

Orthobrombenzyl bromide ($C_6H_4^{o}Br.CH_2Br$) was prepared from orthobromtoluole. It forms a pale yellow oil of an agreeable odor, and appears to boil at 250–260°, at which temperature it is decomposed with evolution of hydrobromic acid. It does not seem to be attacked by potassic dichromate and sulphuric acid, although the corresponding alcohol is completely destroyed by this mixture.

Parachlorbenzyl bromide ($C_6H_4Cl.CH_2Br$) was obtained from parachlortoluole by treatment with bromine. It crystallizes from its alcoholic solution in colorless prisms, or in radiated bunches of needles; melts at $48\frac{1}{2}°$, and is not perceptibly affected by the oxidizing mixture.

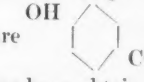
Paraiodbenzyl bromide ($C_6H_4I.CH_2Br$) was made from paraiodtoluole. It separates from its solution in alcohol in flattened needles, fusing at 78¾°. The above substituted benzyl bromides are nearly insoluble in water, but dissolve readily in hot alcohol and in ether, benzole, carbonic disulphide and glacial acetic acid, excepting the paraiodbenzyl bromide, which is but slightly soluble in the last-named menstruum. They all attack the mucous membrane violently, and contain bromine in the side chain, as is proved by the fact that when boiled with alcoholic sodic acetate, each yields the corresponding substituted benzyl-acetate, from which the alcohol can be prepared by treatment with ammonia. The author's further investigation on these and other derivatives will be described in future articles.

VI. An Apparatus for Gas Analysis from Simple Laboratory Material, A. V. E. YOUNG.

Noticed elsewhere.

VII. On the Oxidation of Substitution Products of Aromatic Hydrocarbons.

II. *On the Oxidation of Xylenesulphamides,* IRA REMSEN and M. W. ILES. (Continuation.)

Orthocresole from Oxytoluic Acid.—Orthocresole was prepared by distilling a mixture of oxytoluic acid and quick-lime. The cresole, thus formed, solidified when cooled with a freezing mixture, and was converted into benzoylorthocresole upon treatment with benzoyl chloride. The fact that this cresole is pure orthocresole was proved by fusing it with potassium hydroxide, when only salicylic acid was obtained. The authors express the belief that the oxytoluic acid prepared by them is identical with the orthohomoparaoxybenzoic acid of Tiemann and Schotten,* and has the structure 

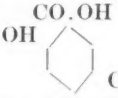
and note the fact that another oxytoluic acid has been obtained by Jacobsen † (also from *o* xylenesulphamide), which is clearly not identical with the one under present consideration, and which, when heated with hydrochloric acid, is converted into carbonic acid and *paracresole;* whereas the acid prepared by them yields orthocresole by this treatment.

* Ber. d. d. chem. Gesell., 11, 767.

† Ibid, 11, 374.

Xylidinic Acid.—In order to corroborate the author's views regarding the structure of sulphaminemetatoluic acid, potassium sulphaminemetatoluate was fused with sodium formate, the product obtained decomposed with hydrochloric acid, and the resulting acid submitted to processes of purification. The bibasic acid thus prepared, fused at 280—282°, and presented the other characteristics of xylidinic acid.

Sulphoisophthalic Acid.—Upon oxidizing sulphaminemetatoluic acid with potassium permanganate, tribasic sulphoisophthalic (*not sulphamineisophthalic*) acid was obtained. This reaction is noteworthy, the transformation of the sulphamide-group into the the sulpho-group being abnormal.

Oxyisophthalic (*α phenoledicarbonic*) *Acid from Sulphoisophthalic Acid.*—Oxyisophthalic acid was prepared by adding acid potassium sulphoisophthalate to fusing potassium hydroxide. Salts of the acid were prepared and analyzed. The bibasic acid thus formed is identical with that prepared by Ost,* and by Tiemann and by Reimer,† and has the structure 

The authors regard the views previously expressed by them in regard to the nature of sulphaminemetatoluic acid as substantiated by the above reactions. The amide already noticed as being formed, together with α xylenesulphamide, and which was suspected to be a derivative of paraxylene, gave, upon oxidation, monobasic sulphamineparatoluic acid, which, upon treatment with hydrochloric acid, yielded paratoluic acid, from which, by means of potassium pyrochromate and sulphuric acid, an acid not fusing at 310° (probably terephthalic acid) was obtained. Sulphamineparatoluic acid, upon oxidation with potassium permanganate, yields tribasic sulphoterephthalic acid, the further study of which is deferred for a future paper.

III. *On the Oxidation of Bromparaethyl-toluene*, IRA REMSEN and H. N. MORSE.

This investigation was undertaken with a view of determining the question whether there is any difference in degree between the influence exerted by the group CH_3 and that exerted by C_2H_5, C_3H_7, etc. Ethyl-toluene was prepared by treating a mixture of ethyl iodide

* Journ. prakt. Chem., N. F., **14**, 93 and **15**, 301.

† Ber. d. d. chem. Gesell., **10**, 1,571.

and parabromtoluene in ether, with sodium; it was next heated with bromine, and the product, thus obtained, oxidized with potassium pyrochromate and sulphuric acid. The resulting acid is bromparatoluic acid. It fuses at 203–204°, and is identical with the acid described by Jannasch and Dieckman.* Upon extracting the bromide by treatment with sodium amalgam, paratoluic acid was obtained.

The authors hold that in the above transformation, the methyl-group is protected from oxidation on account of its occupying the ortho relation to the bromine atom, whereas the ethyl is oxidized because it stands in the meta-relation to the bromine, and ascribe to bromethyl-toluene the structure in which case it would appear that one of the groups (presumably the C_2H_5) acts more strongly on the bromine atom than the other. The investigations of Landolph, † Fittica ‡ and others, on the oxidation of mono-substitution products of cymene, are cited as bearing on the questions discussed in this paper.

VIII. Note on the Determination of Silicon in Pig Iron and Steel, THOS. N. DROWN.

(Noticed elsewhere.)

IX. On a New Base, EDGAR F. SMITH. — In this paper the action of aniline on a carbon chloride ($C_{21}Cl_{26}$), which was obtained by treating toluene with dry chlorine gas, and was noticed in the *Proceedings of the Am. Phil. Soc.*, May, 1877, is described. On heating this compound with aniline in a sealed tube for about six hours, a new base containing chlorine and nitrogen was prepared. It is easily soluble in the ordinary solvents, but was obtained from the concentrated aqueous solution in thin broad scales, fusing at 230° C. The hydrochloric acid salt was prepared in long, broad crystals, easily soluble in water and alcohol. The analysis gave 28.43 per cent. of chlorine.

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*Ann der Chem., **171**, 84.

† Ber. d. d. chem. Gesell., **5**, 267.

‡ Ann. d. Chem., **172**, 308.

X. Laboratory Notes from the University of Cincinnati.

On Some New Salts of Aniline, MILES BEAMER and F. W. CLARKE.

Aniline Chlorate.—Formed by the direct union of aniline and chloric acid; readily soluble in alcohol and ether, less easily in water; detonates sharply when struck, and explodes when brought in contact with concentrated sulphuric acid or when heated to 75°.

Aniline Perchlorate.—Prepared in a similar manner as the chlorate; crystallizes in large rhombic plates.

Aniline Iodate.—Obtained by adding a solution of iodic acid to aniline; slightly soluble in cold water, more readily in alcohol; is deposited from the latter solvent in fine nacreous crystals; darkens at 110°, and explodes if suddenly heated to 125°. Sp. g. = 1.48 at 13°.

Aniline Fluohydrate.—Beautiful scales; very soluble in boiling alcohol, from which it rapidly separates out on cooling.

Aniline Phthalate.—Crystallizes in clusters of concentric needles, melting at 145–146°.

Aniline Monochloracetate.—Crystallizes in slender needles, which fuse at 88°. Upon boiling its aqueous solution, it is decomposed.

Aniline Dichloracetate.—Long white prisms melting at 122°.

Aniline Trichloracetate.—Rhombic plates, which fuse at 145°.

Note on Lithium Picrate, MILES BEAMER and F. W. CLARKE.

This salt was obtained by dissolving lithium carbonate in an alcoholic solution of picric acid. It is of a yellow color, blackens at 200°; heated suddenly in a flame it explodes. Sp. g. = 1.716 at 19°.

Preliminary Notice of a New Volatile Alkaloid, W. L. DUDLEY.

Spigelia marilandica, or pink root, was mixed with milk of lime, and distilled, the distillate being received in hydrochloric acid, evaporated to dryness, and the residue extracted with alcohol. The crystalline substance obtained in this manner is soluble in water and gives the following reactions: Iodine (in KI sol.) = brownish-red precipitate; potassio-mercuric iodide = white crystalline precipitate; metatungstic acid = white flocculent precipitate. The author applies the name of spigelina to this new base.

XI. On Heptane from Pinus Sabiniana, T. E. THORP.—This article describes the physical characteristics of the hydrocarbon (previously mentioned by Wenzell in the Pharm. Jour., March 30, 1872) obtained by distilling the exudation of the *Pinus Sabiniana*, or Digger Pine, which is indigenous to California. The crude oil is met

with in San Francisco as an article of commerce, under the names of "abietine," "erasine," "aurantine," "theoline," etc., and is a nearly colorless, inflammable, mobile liquid, possessing a strong orange-like odor, and furnishes, on distillation, a product boiling at 101°. This oil offers striking differences in boiling point and specific gravity, from oil of turpentine, from which it is also distinct in chemical properties. The author's investigations indicate that the liquid is normal heptane. He gives the following data in regard to the oil purified by agitation with sulphuric acid and distillation: Boiling point, 98. 43°; formula, C_7H_{16}; specific gravity, 0.70057 at 0°; specific volume, 162.54; molecular refractive energy, 56.4; optical activity (of crude oil), 12° 23.5′; viscosity, at 15.31°, .004236, at 54.84°, .002895; surface tension, 22.19 and 21.12 (the lowest of any liquid yet measured), the angle of capillarity being 167°.

The author regards the heptane obtained from *P. Sabiniana*, as at least isomeric with that obtained from petroleum and shale-oil, and remarks, that while it has the same specific gravity as the heptane prepared by heating azelaic acid with caustic bayta, it possesses a much lower density than the petroleum heptane. He is still engaged in the study of the chemical constitution of the new product.

XII. On the Liquid Toluenesulphochloride, C. FAHLBERG.—On treating liquid toluenesulphochloride with an aqueous solution of ammonia, the following products were formed: (A) A solution above the separated amides, from which, by separation and recrystallization, fine, long needles, fusing at 186—187°, and identical with Blomstrands α toluenedisulphamide were obtained, and (B) a mixed amide which was separated by fractional solution into an amide, melting at 153—154° (toluneorthosulphamide), which, when fused with caustic potash, yielded salicylic acid, and an amide melting at 125°. This latter product was resolved by fractional solution into toluene-orthosulphamide and an amide which fused at 105—108°, and is identical with Beckurt's supposed toluenemetasulphamide.* Analyses of the three above amides gave results corresponding to the formulae:

For the amide fusing at 186–187°, $C_7H_{10}S_2N_2O_4$.
" " " 105–108°, $C_7H_9SNO_2$.
" " " 153–154°, $C_7H_9SNO_3$.

The amide fusing at 105–108°, on oxidation, gave parasulphamine-benzoic, anhydrorthosulphaminebenzoic and orthosulphobenzoic acids, showing that this product (Beckurt's "toluenemetasulpha-

* Ber. d. d. chem. Gesell., 10, 943.

mide") is really a mixture of toluene*para*sulphamide and toluene-*ortho*sulphamide. The author is engaged in the oxidation of toluene-disulphamide and the investigation of α toluenecyanide.

XIII. On the Products Obtained by the Nitration of Meta-chlorsalicylic Acid. EDGAR F. SMITH and GERTRUDE K. PEIRCE.—Metachlorsalicylic acid was gradually added to fuming nitric acid and water added to the cooled solution, whereupon a yellow-colored mass separated out, which was treated with potassic carbonate acid, subjected to crystallization, when long red crystals (product A) were first obtained, the mother liquid yielding a mass of dark red nodules (product B).

Product A.—Upon recrystallization, was separated into a salt, crystallizing in long red needles, which proved by analysis to be potassium monochlordinitrophenole, the free acid obtained from it fusing at 80° and solidifying at 69° (identical with the phenole of Rogers * and the alpha-monochlordinitrophenole of Faust and Saame †); and a salt crystallizing in orange-colored needles, having the formula $C_6H_2Cl(NO_2)_2OK + 1\frac{1}{2}H_2O$, being also a derivative of monochlordinitrophenole. The phenole obtained from the latter salt fuses at 79–80°, but again solidifies at 25°. The silver salts of the above acids also exhibit noticeable differences in color, etc.

Product B.—When purified, was obtained in long yellow needles, possessing a satiny lustre, and yielded an acid melting at 162–163°, which is undoubtedly identical with the acid described by Huebner ‡. The potassium and barium salts were prepared and analyzed. The silver salt, when heated with ethyl bromide, yields ethyl-meta-chlornitrosalicylate ($C_6H_2^{m}Cl^{o}OHNO_2COOC_2H_5$), which was obtained in flattened needles, fusing at 89°, from which metachlornitrosalicylamide ($C_6H_2^{m}Cl^{o}OHNO_2CONH_2$) was prepared by heating with alcoholic ammonia. This compound forms brick-red crystals, melting at 199°. The results of the above investigations show that two nitro-acids are formed by the nitration of metachlorsalicylic acid. The authors also prepared alpha-monochlordinitrophenole aniline [$C_6H_2Cl(NO_2)_2OHC_6H_5NH_2$], by dissolving the phenole in aniline, which compound forms light-yellow needles, fusing at 137°.

* Proc. Am. Phio. Soc., June 21, 1878.

† Ann. der Chemie, 1870, **7**, Supp. B, 174.

‡ Jahresbericht, 1866, 349.

XIV. On Glycocholic Ether. ALFRED SPRINGLER.—Glycocholic ether was obtained by dissolving glycocholic acid in alcohol, passing dry hydrochloric acid gas through the solution for twenty-four hours, and heating this solution with alcohol and hydrochloric acid in a sealed tube for about two days. This ether possesses a dark-brown color, and has a sp. g. of 0.901. It decomposes upon exposure to the air and on treatment with water, glycocholic acid being separated in the latter instance. The analyses gave figures agreeing with the formula $C_{26}H_{42}(C_2H_5)NO_6$. Choloidic, hyoglycocholic and hyotaurocholic ethers were also made, and will be fully described in a future communication.

Berichte der deutschen chemischen Gesellschaft.

Abstractor, P. TOWNSEND AUSTEN, PH. D., F. C. S.

On Two New Cyanuric Acids, J. HERZIG (Ber. d. d. chem. Ges., **12**, 170).—By action of hexabromaceton on urea instead of the expected tribromacetyl-urea or carbonyl-urea, two new cyanuric acids were formed, their relative amounts varying with the temperature. They were separated by their different solubilities in alcohol.

α cyanuric acid is very difficultly soluble in alcohol. From water it crystallizes in small, hydrous, colorless, tasteless needles, pointed at both ends. It sublimes without fusion. At a high temperature it gives off vapors of cyanic acid. With phosphorus pentachloride, trichloreyan is formed. *Silver ammonium α cyanurate* is formed by the action of ammoniacal silver nitrate solution in a *cold* saturated solution of the acid. The *copper ammonium*, *barium ammonium* and *barium* salts, were also examined.

β cyanuric acid is much more easily soluble in alcohol than the preceding. Fine silky glistening needles. Heated in a glass tube, it gave no cyanic acid vapors. With phosphorus pentachloride, no trichloreyan was formed. The *copper ammonium* and *silver ammonium* salts were examined.

On the Formation of Monochlorlactic Acid and Dichlorpropionic Acid from Glyceric Acid, WERIGO and MELIKOFF (Ber. d. d. chem. Ges., **12**, 178).—By heating glyceric acid with hydrochloric acid for several days in a closed tube, *monochlorlactic acid* and *dichlorpropionic acid* were formed. The former is a syruppy liquid, not distillable without decomposition, easily soluble in

water and alcohol. It decomposes so easily that the formation of salts is difficult. The ethyl ether is also unstable, and is decomposed by bases and carbonates. With ammonia, the ether gave a basic body resembling serine in its properties. With silver oxide, the acid regenerates glyceric acid.

Dichlorpropionic acid is crystalline and identical with the acid produced by the oxidation of allyl-alcohol-dichloride. The ether is identical with the ether obtained by the decomposition of the chloro-anhydride of glyceric acid with alcohol. It is easily decomposed by bases giving derivatives of monochloracrylic acid.

On the Boiling Points of the Ethers and Alcohols of Oxy-Acids, L. SCHREINER (Ber. d. d. chem. Ges., **12**, 179).—The methyl ether of our oxaci-ester boils at about 10° lower than the ester. The boiling point of an ethyl ether is about the same as the corresponding ester. The b. pt. of an ethyl ester which has had its alcoholic alkyl increased by CH_2, rises about 20°, analogously to the so-called mixed ethers of the normal alcohols. By an equal increase in the acid alkyl, the b. pt. rises only 10°, while the fatty acid esters show a rise of 20°.

Chromium Black on Wool, M. REIMANN (Ber. d. d. chem. Ges., **12**, 180).—As chrome alum is a waste product from various manufactures, its application as a dye is of importance. Iron salts, particularly the sulphate, give with argol and copper sulphate, by finishing with logwood, a good black, "sedan black." Replacing the iron salt by chrome alum and iron alum, a good black was produced. A similar result was obtained by simply boiling the wool in a bath containing the above 3 salts, and a sufficient quantity of logwood. As there are in this case only neutral salts present, the sulphuric acid in particular being all combined, the wool does not become harsh. The color is not affected by acid, and does not become green on exposure.

On the Anthracene Compounds which belong to the Chrysazine Series, C. LIEBERMANN (Ber. d. d. chem. Ges., **12**, 182).—The author has shown in a former paper that *α anthracene disulphonic acid* leads to chrysazine, while *β anthracene disulphonic acid* yields anthrarufine according to the following progression.

Anthracene disulphonic acid ..... $C_{14}H_8(SO_3H)_2$
Dioxyanthracene ..... $C_{14}H_8(OH)_2$
Acetyldioxyanthracene ..... $C_{14}H_8(OC_2H_3O)_2$
Acetyldioxyanthraquinone ..... $C_{14}H_8O_2(OC_2H_3O)_2$
Dioxyanthraquinone ..... $C_{14}H_8O_2(OH)_2$

The sodium α anthracene disulphonate is more difficultly soluble in water and sodium hydrate solution than the corresponding β salt, and on this fact the separation of the isomeric acids is based. A number of the salts of both acids were prepared and examined.

By fusion of the α sodium salt with KOH, *α dioxyanthracene, chrysazol*, was obtained in leaves or yellow needles. It decomposes at about 220°. It is different from all other anthracene derivatives in its easy solubility in cold alcohol. The yellow solution fluoresces strongly blue. Dry, it is tasteless, but the alcoholic solutions occasion burning on the tongue. The properties of chrysazol agree well with those of a true phenole of the anthracene series. Alkalies dissolve it with a yellow color, the warm solution turning green and forming black films by oxidation on exposure to the air. With ferric chloride or bromine water, the alcoholic solution gives a bluish-green color reaction. The properties of rufol and chrysazol are very similar.

Diacetyl-chrysazol $[C_{14}H_8(OC_2H_3O)_2]$, by acetation of chrysazol with sodium acetate and acetic anhydride. Silvery glistening leaflets or needles, f. pt. 184°. The isomeric acetyl rufol fuses at 197–199°.

Diacetyl-chrysazine $[C_{14}H_6O_2(OC_2H_3O)_2]$, by oxidation of the preceding compound with CrO_3 in glacial acetic acid solution. Bright yellow leaflets or needles, f. pt. 227–232°. It agrees entirely with the diacetyl-chrysazine produced from chrysaminic acid.

Chrysazine $[C_{14}H_6O_2(OH)_2]$, by boiling the preceding body with KOH and precipitating with HCl. Sublimes in red needles. From alcohol it crystallizes in splendid yellowish-red needles or leaflets, f. pt. 191–192°. Soluble in alkalies. The Ca, Ba and Pb-salts, are insoluble. The yellow-reddish solution gives two absorption bands, and can easily be distinguished from anthrarufine by the spectroscope. It is identical with the chrysazine from aloe-chrysaminic acid.

Tetra-nitrochrysazine-potassium, anhydrous. Properties same as those of potassium chrysamuriate. *Tetra-nitrochrysazine-magnesium* $[C_{12}H_2(NO_2)_4O_4Mg + 5H_2O]$, reddish, golden, glittering, extremely thin leaflets.

Tetra-nitroanthrarufine-potassium $[C_{14}H_2(NO_2)_4O_4K_2+H_2O]$, brown, metallic, glittering, difficultly soluble microscopic columns. The *magnesium salt* $[C_{14}H_2(NO_2)_4O_4Mg + 6H_2O]$ forms green, metallic, glittering, difficultly soluble needles. The *sodium salt*, beautiful, dark-green needles, glittering like cantharides.

On the Reduction of Anthraquinone-sulphonic Acid, C. LIEBERMANN (Ber. d. d. chem. Ges., **12**, 189).—Anthraquinone-monosulphonic acid is obtained very pure from the alizarine manufac-

ture. The Na, Ba and Ca-salts form white leaflets, difficultly soluble in water. *Sodium anthraquinone-monosulphonate* reduced with HI and I, gives *sodium-anthracene-hydromonosulphonate*, in splendid asbestos-like needles an inch long, moderately soluble in water. The Ba and Ca-salts were examined. By fusing with KOH, *mono-oxyanthracene* was not formed, as the substance decomposed with the formation of anthracene and anthracene-dihydride. To remove the hydride group, the body was heated with conc. H_2SO_4, but instead of a monosulphonic acid, a disulphonic acid was obtained.

Action of Potassium Carbonate on Isobutylaldehyde. Preliminary notice. F. Urech (Ber. d. d. chem. Ges., **12**, 191).—By treatment of isobutylaldehyde with potassium carbonate at ordinary temperature, a viscous liquid was obtained, which, on distillation, yields isobutylaldehyde and condensation products arising from the loss of water. By boiling isobutylaldehyde containing some acetone and perhaps some isobutyl alcohol, with K_2CO_3, compounds with higher boiling points were obtained. A distillate at 154° showed the union of 3 mols of isobutylaldehyde under loss of one mol of water, $C_{12}H_{22}O_2$.

On Dibromcapric Acid, Carl Hell and Paul Schoop (Ber. d. d. chem. Ges., **12**, 193).—Dibromcapric acid was found by treatment of capric acid with bromine, in the cold. Glassy monoclinic prisms, f. pt. 135°. Difficultly soluble in cold water, decomposed on boiling. Alkalies under pressure extract bromine and leave an oil having the odor of peppermint and amyl compounds. It would appear to be *monobromnonyl*, $C_9H_{17}Br$.

On the Limits of the Application of the Methods of Vapor Density Estimation in Barometric Vacuum, J. W. Brueil (Ber. d. d. chem. Ges., **12**, 197).—Not suitable for abstraction.

A Process for Purifying Mercury, J. W. Brueil (Ber. d. d. chem. Ges., **12**, 205).—To a liter of water, 5 gms of potassium bichromate and a few cc of H_2SO_4 are added, and the whole shaken well with an equal volume of mercury. The metal breaks up into little globules, while a very small portion is changed into red chromate. The flask is shaken until the red chromate vanishes. The solution appears green from chromium sulphate. A powerful stream of water is then led into the flask, and carries away a fine gray powder which lies on the surface of the metal and between the globules. These operations are repeated until no more gray powder is formed.

In this manner mercury containing Wood metal, and also some which had been used for amalgamating the plates of a galvanic battery, were easily obtained pure.

On the Formation of Sulphonic Acid from Sulphones, R. Otto (Ber. d. d. chem. Ges., **12**, 214).—Equal parts of sulphobenzid and sulphenyl chloride heated at 120°, give

$$\begin{matrix} C_6H_5 \\ C_6H_5 \end{matrix}\Big\} SO_2 + \begin{matrix} HO \\ Cl \end{matrix}\Big\} SO_2 = HCl + \begin{matrix} C_6H_5 \\ C_6H_4(SO_2 . OH) \end{matrix}\Big\} SO_2$$

Sulphobenzid-monosulphuric acid.—When two mols of sulphenyl chloride are taken, the disulphonic acid is formed, $C_{12}H_8(SO_2OH)_2SO_2$.

Barium salt.—$C_{12}H_8[(SO_2O)_2Ba]SO_2 + 5H_2O$. Separates easily from hot water in heavy white crystals, which lose their water at 140°. A trisulphonic acid could not be obtained by heating with three mols of chlorsulphenyl.

On the Preparation of Hydrogen Sulphide in Judiciary Chemical Investigations, R. Otto (Ber. d. d. chem. Ges., **12**, 215).—The author finds that H_2S prepared from iron sulphide containing arsenic, is contaminated with arsenuretted hydrogen. It is, hence, absolutely necessary in forensical examinations, that the H_2S be prepared from material perfectly free from arsenic. Myers recommends iron sulphide made from washed flowers of sulphur and the purest wrought iron. For sulphuric acid, the first parts of the rectification are to be taken, which, although they contain oxides of nitrogen, are free from arsenic. Author recommends the use of calcium sulphide, which can easily be prepared by igniting gypsum with carbon, and pure chlorhydric acid. This yields an H_2S which is also free from hydrogen (Mohr advises the use of barium sulphide for the same purpose).

Journal fuer Praktische Chemie.

New Series, Vol. XIX.

Abstractor, Edgar Everhart, Ph. D.

Thermo-chemical Investigations, Julius Thomsen. The article does not admit of abstraction.

On Diphenoles, L. Borth and J. Schreder (J. pr. chem., **19**, 22).—On fusing phenole with potash, two diphenoles, both having the formula $C_{12}H_{10}O_2$, are produced. After separating the salicylic and oxybenzoic acids from the raw product, it is distilled in a partial vacuum, the distillate containing both diphenoles. These

last may be separated from each other, though not entirely, by fractional distillation. The α diphenole crystallizes in needles, the β diphenole, in scales. Both yield diphenyl on distillation with zinc dust

Oxyphenylacetic Acid. $C_8H_8O_3$, P. FRITZSCHE (**19**, 33).—The author subjects this acid, discovered 1859, by Heintz, and called by him phenoxacetic acid, to a further examination. On simply heating the acid with alcohol, it yields an ether with the formula $C_8H_7O_3\,C_2H_5$. Its corresponding amide is formed by treating the ether with concentrated ammonia. On heating the acid with concentrated nitric acid, a substance is formed having the formula $C_8H_5N_2O_7$. Its reaction is acid. HNO_3 always replaces two atoms of hydrogen. The mononitro-derivative may be produced by the action of sodium-monochloracetic acid on sodium-nitrophenole.

Pyromeconic Acid, $C_5H_4O_3$, DR. H. OST (**19**, 34).—Formed from meconic acid by the elimination of two molecules of carbonic anhydride. Besides the normal salt of the general formula $C_5H_3MO_3$, it forms acid compounds with the formula $C_5H_3MO_3 . C_5H_4O_3$, which easily give up a molecule of pyromeconic acid.

Chromates and Dichromates, L. SCHULERUD (**19**, 36).—While chromic acid forms neutral salts with most acids, there are but few dichromates. After experimenting on many bases, the author comes to the conclusion that only univalent metals are capable of forming dichromates.

Action of Trimethylamine on Carbon Disulphide, A. BLEUNAR (**19** 41).—Carbon disulphide, dissolved in alcohol, is treated with trimethylamine. The molecules of each unite and form a crystalline compound, having the formula $N(CH_3)_3CS_2$. Although this body is decomposed by concentrated mineral acids, yet with dilute it forms well-defined crystalline salts.

Detection of Salicylic Acid in Beer, M. BLAS (**19**, 43).—In consequence of the very general practice of preventing the injurious after-fermentation of beer by means of salicylic acid, the author has performed a series of experiments on its detection.

In all the experiments, the presence of the acid was recognized by means of ferric chloride. The beer to be analyzed was either treated directly with this reagent, or after precipitation with acetate of lead, and removal of the excess of lead by means of sulphuric acid, or it was shaken up with ether, and the etherial solution tested for the salicylic acid. He also recommends the process of treating the beer

with a little animal charcoal, which retains the acid, and testing the alcoholic solution. When the beer contains from 0.075 to 0.10 grm of the acid per liter, these tests can be used with certainty, although in the case of dark-colored beers this percentage is too low.

The salicylic acid may be detected with much more ease and certainty, however, if the urine, collected several hours after drinking of the beer, be examined. By this means very minute traces may be recognized, since from 50 to 60% of the acid used is given off, and since 1 part of the acid can easily be detected in 80,000 parts of urine. The author recommends that the urine be also tested, before drinking the beer, for possible traces of phenole or a sulphocyanide. He does not regard the addition of salicylic acid as an adulteration, but as a harmless preservative.

On the Existence and Formation of NiO Ni_2O_3, H. BAUBIGNY (**19**, 46).—This body corresponding to cobaltoso-cobaltic oxide, CoO Co_2O_3, may be best produced by the action of moist oxygen on nickel chloride, at a temperature of 440°.

The Bromopurpureo-cobalt Salts, S. M. JOERGENSEN (**19**, 49).—The bromopureo-cobaltic bromide, $Br_2(Co_2 10NH_3)Br_4$, from which the other salts are derived, is formed by dissolving the carbonate of cobalt in hydrobromic acid, filtering and treating with ammonia in excess. The liquid is oxidized by means of a current of air drawn through it, till it becomes of a cherry-red color. After filtration, the filtrate is treated with hydrobromic acid, and heated on the water bath for several hours, when all the bromopurpureo-cobaltic bromide separates out. Many derivatives have been made by substituting for the bromine, various salts or acids.

Chemical Affinity, C. M. GULDBERG and P. WAAGE (**19**, 69).
The article does not admit of abstraction.

A Calorimetric Method, F. STOHMANN (**19**, 115).
The article does not admit of abstraction.

Chemical Researches on the Composition of Wood, TH. THOMSEN (**19**, 147).

Isomalic Acid, M. SCHMOEGER (**19**, 168).—By brominating the iso-succinic acid, and replacing the bromine by hydroxyl, the isomalic acid is produced. The silver salt corresponds to the formula $C_4H_4Ag_2O_5$.

The Specific Gravities and Atomic Volumes of the Metals of the Cerium Group, and their Oxides, R. HERMANN (**19**, 172).

Oxyphenylpropionic Acid, $CH_3CH(OC_6H_5)COOH$, L. SAARBACH (**19**, 175).—This acid is formed by the action of sodium phenole on α chlorpropionate of soda. It crystallizes out of hot water in vitreous needles.

Wine Oil, E. HARTWIG (**19**, 176).—In a research on the "wine oil" formed during the manufacture of ether, the author has been able, by fractional distillation, to split it up into various components, although he has not yet isolated any one body.

Reports on Foreign and American Patents relating to Chemistry.

Foreign Patents.

Condensed from R. BIEDERMANN's Report to the German Chemical Society, by H. ENDEMANN.

LEOPOLD LOEWENTHAL, London: (Germ. P., No. 4046, Jan. 11, 1878.)—*Apparatus for the purification of air,* so as to make it again fit for respiration.

AD. STEINBRUECK, Halle: (Germ. P., No. 4472, July 13, 1878.)—*Nitrogen for inhalation* prepared from air by means of red hot iron filings and turnings, and subsequent purification by potash solution.

JOHN HOLLWAY, London: (Engl. P., No. 1131, March 11, 1878.)—*Sulphur from pyrites* and recovery of the metals therefrom.

WILL STEVENS SQUIRE, London: *Apparatus for the manufacture of sulphuric anhydride.* (Germ. P., No. 4289, March 3, 1878.)—Sulphuric anhydride is produced by the action of oxygen upon sulphur dioxide, under the influence of platinized asbestos.

R. MESSEL, Silvertown, and W. MAJERS, Schlebusch: Manufacture of *sulphuric monohydrate.* (Engl. P., No. 1201, March 26, 1878.)

J. A. W. WOLTERS, Kalk: (Germ. P., No. 6091, Oct. 13, 1878.)—Has simplified his process for the manufacture of *sulphuric anhydride* from a mixture of sodium bisulphate and magnesium sulphate, by at once redissolving the residue in sulphuric acid. On heating, first water evaporates, then the anhydride. The acid must be employed in the quantity of one equivalent to two equivalents of salt. The residue from the distillation has the formula

$$\begin{matrix} SO_4 \diagup \diagdown Na \\ \qquad\quad Mg \\ SO_4 \diagdown \diagup Na. \end{matrix}$$

F. VORSTER, Kalk near Cologne: *Treatment of phosphate of lime for superphosphates.* (Germ. P., No. 4689, July 21, 1878.)—The phosphates are intimately mixed with pyrites and calcined for 24 hours. Subsequent treatment with acid produces superphosphates, which will never contain reduced phosphoric acid, since alumina and iron become by this treatment insoluble.

L. RISSMUELLER and H. WIESINGER, Goettingen: (Germ. P., No. 4563, Feb. 24, 1878.)—Produce a *fertilizer* rich in nitrogen, by boiling leather waste with lime water.

ERNST LAUENSTEIN, Mittweida: (Germ. P., No. 6127, Sept. 13, 1878.)—*Phosphate of lime* and alumina *from all phosphates* containing alumina and iron. The natural phosphates are first dissolved in hydrochloric acid (33%). The solution is then carefully precipitated with lime for the purpose of removing iron and alumina from the solution. Finally the acid lime phosphate is also precipitated with more lime. To utilize the phosphoric acid in the iron and alumina phosphates, they are heated under pressure with strong soda lye, which after filtration is evaporated to crystallization. Thus 90 per cent. of the phosphoric acid in the precipitate is obtained as sodium phosphate.

OTTO ZWIETUSCH, Milwaukee: *Automatic apparatus for the generation of carbonic acid gas.* (Germ. P., No. 4931, March 17, 1878.)—This is especially constructed to be used with barrels filled with lager beer, ale, etc., on draught, and is so constructed, that if the pressure has reached a certain point, the marble is removed from the acid, and the development of gas thus checked. For the purification of the gas it is conducted through a bottle containing sodium bicarbonate.

OTTO BRAUN, Berlin: (Germ. P., No. 9688, Aug. 17, 1878.)—*Removes the gases from mineral waters* by an air pump instead of by heat.

SCHROECKER, Artern: (Germ. P., No. 5647, Nov. 12, 1878.)—*Evaporates salt solution in funnel-shaped pans* which are heated on the sides. To prevent the formation of crusts of salt on the sides of the pans above the surface, fresh solution constantly enters into the pans as a fine rain, thus flushing the sides effectually.

H. COMPTON, Ashlin, and RICH. PINDER, Asbridge, Liverpool: *Evaporating pans for salt solutions* in the *manufacture of salt.* (Engl. P., No. 2726, July 8, 1878.)—The pans are heated from the sides, the grating being higher than the bottom of the pans. There is one fire between two pans, and the waste gases are used for heating two more. The first two give fine salt, the second a coarse grained article. The main point is that the portion of the fires prevents the formation o incrustations.

M. SCHAFFNER and W. HELBIG, Aussig: *Complete utilization of the waste products in the manufacture of soda.* (Germ. P., No. 4610, Feb. 20, 1878.)—This process is based upon the action of magnesium chloride upon calcium sulphide, which results in the formation of calcium chloride, magnesia and hydrogen sulphide. Under the influence of carbonic acid gas, calcium chloride and magnesium hydrate, give carbonate of lime and magnesium chloride. The hydrogen sulphide which is formed in the reaction first described, is converted into sulphur

by sulphurous acid in magnesium and calcium chloride solution. The process may be described by the following formulae :

I. $CaS + MgCl_2 + H_2O = CaCl_2 + MgO + H_2S$.
II. $MgO + CaCl_2 + CO_2 = MgCl_2 + CaCO_3$.
III. $2H_2S + SO_2 = 2H_2O + S_2$.

CERF MEIER LEVI and GUSI. ALEXANDER, Paris: (Engl. P., No. 1899, May 11, 1878.)—*Wash powder* consisting of 100 parts soda, 10 rosin, 50 silicate of soda, 12 decoction of Iceland moss. The mixture is pressed into cakes.

A. BLUEGEL, Berlin : (Germ. P., No. 4207, July 24, 1878.)—New *furnaces* for the manufacture of *sodium and potassium sulphates.* The heat is applied from above.

KARL LIEBER, Charlottenburg: Method for the *Manufacture of soda, potash and alumina.* (Germ. P., No. 9610, Nov. 26, 1878.)—Potassium or sodium chloride are mixed with kieserit in the proportion of 2KCl to $MgSO_4$, then so much bauxite is added that the alumina may just be equivalent to the potassium in the formed sulphate. The whole is formed into blocks, dried and heated in a shaft furnace; when red-hot, steam is injected. At first muriatic acid is formed, which may be condensed as usual. Finally the sulphuric acid is acted upon and removed as sulphurous acid, thus leaving potassium or sodium aluminate behind, which is dissolved in water and decomposed by carbon dioxide.

E. W. PARNELL and JAMES SIMPSON, Liverpool: *Improvement in the manufacture of caustic alkalies.* (Engl. P., No. 2203, June 1, 1878.)

EMIL MEYER, Coepenick: Method for the manufacture of *pure potassium carbonate and hydrate.* (Germ. P., No. 5061, Oct. 19, 1878.)—A solution of Leblanc potash, which always contains large quantities of caustic potash, is concentrated to a specific gravity of 1.47 to 1.56. On cooling, pure potassium carbonate is obtained in large crystals. Sodium compounds, chlorides and caustic potash, remain in the mother liquor. On further concentration to 1.5 or 1.54 specific gravity, all carbonates separate from the boiling hot lye, and finally, after cooling the compound, $KHO.H_2O$ is obtained in large crystals, which may be perfectly pure, provided that the mother liquor is poured off at a temperature between 40 and 60° C. Chlorine and sulphur compounds, as well as all sodium salts, remain in the mother liquor.

R. GRUENEBERG, Alt-Damm near Stettin: *Potassium sulphate from potassium chloride and magnesium sulphate.* (Germ. P., No. 4933, April 19, 1878.)—By the action of magnesium sulphate upon potassium chloride in concentrated solution, schoenite is formed ($K_2SO_4+MgSO_4+6H_2O$), which on further and repeated treatment with potassium chloride, is finally all converted into potassium sulphate. The mother liquors are evaporated for carnallite, and finally the excessively added potassium chloride recovered by the addition of magnesium sulphate, when more schoenite is formed.

H. GRUENEBERG, Koeln: *Schoenite from carnallite.* (Germ. P., No. 5607, Nov. 19, 1878.)

ACTIEN GESELLSCHAFT CROIX, Croix: (Germ. P., No. 5786, Oct. 6, 1878.)—*Use trimethyl amine* instead of ammonia (Solvay process) *for the conversion of potassium and other chlorides* into the bicarbonates. Thus potassium carbonate of 99.5 per cent. can easily be produced.

F. Dupré and C. N. Hacke, Stassfurt: Method to *remove magnesium chloride from kainit.* (Germ. P., No. 6053, Nov. 9, 1878.)

H. Goldberg, Wiesbaden: (Germ. P., No. 6309, Oct. 3, 1878.)—Method *to obtain the potassium as caustic potash* in the manufacture of *tartaric acid* from cream of tartar. 226 pts. of neutral potassium tartrate are dissolved in eight times this quantity of water, and this mixed with 112 pts. of quicklime previously slacked with 16 pts. of water. Most of the lime is precipitated at once; some, however, remains in solution, but can be easily removed by heat under pressure. The solution contains then only caustic potash.

Carl Heintzel, Lueneburg: (Germ. P., No. 4416, July 30, 1878.)—Produces *hydraulic cement* by mixing equal parts of infusorial earth and air slacked lime, and burning this mass.

John Wesley Hyatt, Newark: (Engl. P., No. 1626, April 23, 1878.)—*Silicious material* obtained by mixing pulverized bones, horn, ivory or any other substance containing albumen or glue, with silicate of soda. The mixture may be pressed into moulds or otherwise used, and utensils thus molded may be impregnated with a solution of calcium chloride of 15° B.

E. Meyer, Koepenick: (Germ. P., No. 6083, Sept. 12, 1878.)—Mixtures of *fluor spar or kryolite with sodium silicate solution* are used for *casts, cement or paint.*

Thos. Heskin, Preston: *Manufacture of magnesium.* (Engl. P., No. 2658, July 3, 1878.)

H. Bollman, Condy, and G. Rosenthal, London: (Germ. P., No. 5589, June 25, 1878.)—Manufacture of *alumina free from iron,* by converting the iron into sulphuret, which can easily be removed by dilute acids.

Joseph Kempner, Gorlitz: (Germ. P., No. 4551, July 4, 1878.)—Uses *feldspar* and *barytes* for the production of *opal glass.*

E. J. M. Cetti, London: (Engl. P., No. 1594, April 20, 1878.)—*Fastens the red or black color* used on *thermometers* for the dividing lines, by baking.

Aug. Seguin, Paris: *Method to improve the resistance of metals.* (Germ. P., 5093, Oct. 17, 1878.)

Rich. Falk, Berlin: *Decorating surfaces on metals.* (Germ. P., No. 5011, May 19, 1878.)

Paul Bredt, Barmen: *Decorating metallic plates by a photo-chemical process.* (Germ. P., No. 5204, April 27, 1878.)—The metal is covered wtth an alcohol varnish, then with chrome gelatine mixture. After exposure, the soluble gelatine is removed with water and the bared varnish with alcohol. The thus exposed metal is then acted upon and engraved by an acid.

Edwin Petitt, Cheltenham: (Engl. P., No. 2709, July 6, 1878.)—Improvement in the *manufacture of iron.*

Sidney Gilchrist Thomas, Battersea: *New composition for bricks.* (Germ. P., No. 5869, Oct. 5, 1878.)—This patent has been described on page 262.

C. A. J. Meissner, Schoeningen: (Germ. P., No. 4626, March 8, 1878.)—Prepares *barium sulphate*—blanc fixe—*for oil paints,* by heating to red heat and throwing the powder into cold water.

C. A. F. MEISSNER, Schoeningen : (Germ P., No. 5926, March 8, 1878.)—Method to prepare mixtures of *blanc fixe and zinc white* for the mixture with oil. Add to a soda solution zinc sulphate as long as a precipitate forms, then precipitate the sodium sulphate with barium chloride. The whole is brought to a filter, washed, heated to incandescence and thrown into cold water.

C. A. T. MEISSNER, Schoeningen : (Germ. P., No. 6151, June 13, 1878)—Calcines *artificial zinc sulphide* in an atmosphere of carbon dioxide, to prevent the formation of sulphate.

C. F. CLAUS, Wiesbaden : (Germ. P., No. 6733, Feb. 20, 1879.)—Mixture of *zinc sulphide and barium sulphate* as a base for *paint*. To an alkaline zinc solution so much sodium sulphate and barium sulphide are added, as will be required to precipitate all the barium as sulphate and all the zinc as sulphide. This reaction will result in a mixture of one equivalent of each of the constituents. Other mixtures are likewise prepared. The precipitates are invariably dried, then heated, and finally thrown into water.

F. SCHEIDING, Muenden : *Blanc fixe free from sulphur.* (Germ. P., No. 6722, Jan. 12, 1879.)—Uses chlorine gas for the purpose of removing sulphur from sulphate of baryta, obtained by the precipitation of barium sulphide.

NATHANIEL SHEPHERD KEITH, Brooklyn : (Engl. P., No. 2017, May 20, 1878.)—*Purifying lead*, and recovery of gold, silver and other metals. This is done by electrolysis, the bath being either plumbic nitrate, accetate or sulphate, dissolved in alkaline chlorides.

H. GEBHARDT, Nurnberg: (Germ. P., No. 4699, Aug. 17, 1878.)—Produces *silver leaf* not as was formerly done from a tin-silver alloy, but from brass or copper sheets, which are silver plated.

CLEMENS WINKLER, Freiberg : (Germ. P., No. 4566, Sept. 21, 1878.)—*Platinizing porous substances*, like asbestos, slag wool, infusorial earth, cellulose, gun cotton, etc., by saturating them with platinum chloride solution, and then reducing the platinum by means of sodium formate. Such platinized substances are used to facilitate oxidation.

KNAB, Paris : Various *preparations* obtained with *oxalic acid.* (French P., No. 116,331.)

CHAS. GRAHAM, London : (Engl. P., No. 2092, May 23, 1878.)—*Facilitates fermentation* of saccharine liquids by *æration* with filtered air.

L. RAMDOHR, Halle: (Germ. P., No. 9319, July 28, 1878.)—Improvement in *fractional distillation.*

CH. TELLIER, Paris: *Preservation of vegetable and animal substances.* (Germ. P., No. 5312, April 14, 1878.)—Uses an ice machine, which is worked by methyl ether.

Q. GERSTL, London: (Germ. P., No. 5863, April 18, 1878.)—*Preserves eggs* by immersion for 2 minutes in lime water, and final treatment with carbonic acid gas.

A. HUGENTABLER, London : (Engl. P., No. 2699, July 5, 1878.)—*Preserves meat* with a concentrated solution of sodium acetate.

ADOLF SCHLIEPER, Montreux: (Germ. P., No. 6386, Dec. 13, 1878.)—*Preserves flour* by pressing it into cakes under a pressure of 100 atmospheres.

KENNARD KNOTT, London: Method and apparatus for the *preservation of meat.* (Germ. P., No. 9729, March 16, 1879.)—Describes contrivances which tend to keep the temperature of the meat down, while it is stored or transported.

ALEX. POEHL and ADAM MELTZER, St. Petersburg: (Germ. P., No. 4165, May 19, 1878.) *Disinfecting apparatus.*—Based upon the action of oil of turpentine and water, thrown into the air in a finely divided state by means of an atomizer.

H. LANGSTON JONES, London: *Disinfectant.* (Engl. P., No. 2057, May 23, 1878.)—Consisting of 65 parts common salt, 20 parts zinc sulphate and 15 parts alum or aluminum sulphate.

E. J. CORBETT, San Francisco: *Removal and destruction of sewer gas.* (Engl. P., No. 2213, June 3, 1878.)—The sewers are ventilated into the street lamps, where they pass from below near to the light, which produces the ventilation, and at the same time effectually destroys the sewer gases.

GUST. VAN ALSING, Bedford: *Purification of sewerage waters.* (Engl. P., No. 2644, July 2, 1878.)—Uses first sulphurous acid, then clay, and finally filters through coke.

TH. AG. LECLERQ, Paris: (Engl. P., No. 1129, March 21, 1878.) *Destroys the knots on dyed textile fabrics* by volatilized acid diluted with air. After this treatment the fabrics pass through rollers.

JOH. SCHUMACHER, Posel.—*Transfers colored photographs* to linen, tin or wood. The photograph is produced upon a collodion film formed on paper. It is then roughly colored and varnished, and finally fastened to the linen by means of cheese and lime or a similar material. The paper is then removed by moistening with water and washing. For better protection another coat of varnish is applied.

ALFRED FORD, London: (Engl. P., 2002, May 18, 1878.)—*Increases combustibility of wood* by treating it first with caustic potash lye, and then saturating it with a solution of 10 parts saltpetre, 1 part potassium chlorate and 1 part sugar in 12 parts of water.

C. A. SANCEAU, Verviers: (Engl. P., No. 1856, May 8, 1878.)—*Separation of animal fibres,* like wool, silk, etc., *from vegetable fibres.* Superheated steam is applied, which converts the animal substances into glue, leaving the vegetable fibres behind in good condition for the manufacture of paper.

OLIVER SARONY, Scarborough, and J. R. JOHNSON, London: *Pigment paper.* (Engl. P., No. 2631, July 1, 1878.)

C. T. TOMPKINS, New York: (Engl. P., No. 1874, May 9th, 1878.)—Mixes plaster of Paris with 7 parts of water, stirring continually for ¾ hour. The hydrate obtained is said to be well adapted for *weighting paper and cotton goods.*

E. SCHRADER and O. DUMCKE, Koenigsberg, blow air through varnishes containing oil of turpentine and linseed oil, for the purpose of *bleaching* them. Germ. P., No. 4706, Sept. 7, 1878.)

E. SCHRADER and O. DUMCKE, Koenigsberg: (Germ P., No. 4706, Sept. 7, 1878.)—Use *ozonized air for bleaching* varnishes and linseed oil.

A. M. GOBIN, Lyon: *Artificial Asphaltum.* (Engl. P., No. 1865, May 9, 1878.)—This consists of 15 parts of soft slate bitumen, 45 parts coal tar pitch, 10 parts ground coke, 130 parts pulverized limestone, 160 parts sand.

J. F. HOLTZ, Berlin: (Germ. P., No. 5193, June 28, 1878.)—Mixtures of phenoles and kresols of tar with infusorial earth, sawdust, etc., to make these substances easier to be handled. These mixtures have been called "*phenolith.*"

NOAH JACOBSOHN, Berlin: *Ink powder.* (Engl. P., No. 1586, April 18, 1878.)—Consists of 10 pts. aniline color, 4 pts. sugar, 1 pt. gum arabic, 1 pt. grape sugar.

BERENTH SIEGLER, London: Manufacture of *picric acid.* (Engl. P., No. 1444, April 11, 1878.)—Nitric acid, 1.420 spec. gr., is saturated partly with slacked lime, so that about 30 per cent. of the acid remains unsaturated. To this one-half its weight carbolic acid is added. Within ten to twenty hours mononitrophenole is formed, which, on heating, is converted into trinitrophenole, which is obtained in the free state by the addition of hydrochloric acid.

THE OESTERREICHISCHE ALIZARINFABRIKS GESELLSCHAFT, PRZIBRAM & Co., Vienna: *Sulpho-acids of alizarine and purpurine.* (Germ. P., No. 3565, April 4, 1878; Engl. P., No. 1117, March 20, 1878.)—Nordhausen oil of vitriol of 20 per cent. anhydride is brought to act on alizarine at a temperature of from 100 to 150°. The salts of the sulpho-acids differ in the color according to the base with which they are combined. The shades obtainable are said to be superior to those produced by alizarine, etc.

ACTIEN GESELLSCHAFT FUER ANILINFABRIKATION, Berlin: (Germ. P., No. 4988, June 6th, 1878.)—The patent granted to this company for a new dyestuff obtained from *benzotrichloride* by the action of *aromatic monamines and phenoles*, has been extended so as to embrace also those substances which may be obtained by the action of *benzotrichloride-chlorine derivatives* upon the substances mentioned above.

EDW. TUST, Barmen: (Engl. P., No. 1976, May 16, 1878.)—New *dyestuff* obtained by the action of *benzodichloride upon aromatic amines and phenoles.* Instead of using zinc chloride, cuprous chloride is applied.

E. HEINTZEMANN, Schwalbach: (Germ. P., No. 4570, June 28, 1878.)—*Anthrachinon* from anthracene by means of *chromic acid,* and regeneration of the latter. The last mentioned is done by the aid of mangan peroxide, as illustrated by the following formula, $Cr_2Cl_6+3MnO_2=2CrO_3+3MnCl_2$. The solution and precipitate may at once be used again for the oxidation of another portion of anthracene. If the solution, which is then obtained, be neutralized with lime, chromic oxide will be found in the precipitate while manganese remains in the solution. The precipitate may again be converted into chromic acid. The solution by further addition of lime, yields the manganese, which by Weldon's process may again be converted into peroxide.

FRANC. and JACQUES DUPIN, Paris: (Engl. P., No. 2591, June 28, 1878.) *Iridescent colors* on artificial flowers and feathers by coloring with fuchsine, and subsequent action of chlorine.

BADISCHE ANILIN UND SODA FABRIK, Mannheim: *The sulpho-acids of the oxyazonaphthalenes.* (Germ. P., No. 5411, March 12, 1878.)—New red and brown dyestuffs. See page 180, article "MISCELLANEOUS."

ACTIEN GESELLSCHAFT FUER ANILINFABRIKATION, Berlin: (Germ. P., No. 6714, Oct. 27, 1878.)—Method for the preparation of the sulpho-acids from the green dyes obtained by the action of benzo trichloride upon aromatic tertiary amines, in presence of metal chlorides.

FR. JENSSEN, Hamburg: Method for the manufacture of *benzoic acid and benzoic anhydride.* (Germ. P., No. 6689, Oct. 30, 1878.)—The reaction for the preparation of the latter substance is a follows:

$$2(C_6H_5CCl_3)+3H_2O=\begin{matrix}C_6H_5\,.\,CO\\C_6H_5\,.\,CO\end{matrix}\Big\}O+6HCl$$

The reaction takes place in the presence of much sulphuric acid.

E. SCHRADER and O. DUMCKE, Koenigsberg: *Method and apparatus for melting amber.* (Germ. P., No. 4679, June 29, 1878.)—The melting is facilitated by the addition of from 9 to 10 per cent. of amber colophony, and is carried out in a kettle heated by steam and furnished with a stirring apparatus.

CH. A. BURGHARD, TH. ROWLAY and A. C. SALOMONSON, London: *Utilization of waste and of old vulcanized rubber goods.* (Engl. P., No. 8340, June 12, 1878.)—They are first treated with muriatic acid to destroy cotton and other fabrics and to remove the zinc. The residual rubber is then dissolved in petroleum, carbon bisulphide, benzol and other similar substances, and the solution is then evaporated. If linseed oil has been used, this must be removed with alkali. The rubber thus obtained is then again vulcanized and the solution worked for zinc.

SUDHEIM and KOEPPEN, Cassel: (Germ. P., No. 6051, Sept. 22, 1878.)—*Non-poisonous friction matches,* which may be lighted on any surface. Potassium chlorate, 6 parts, and plastic clay, 3 parts, are mixed with a little water. Then minium, 3 parts, and glue, ¼ to 1 part, pulverized glass, 3 parts, and red phosphorus, 1 part, are addded. For the protection of this mass it is covered with a mixture of sandarac, 2 parts, stearin, 10 parts and naphthalene, 1 part.

S. EGBERT JUDSON, San Francisco: *A new explosive.* (Germ. P., No. 6064, July 26, 1878.)—The particles of blasting powder are first covered with a varnish consisting of 19 pts. sulphur, 3 pts. rosin and 2 pts. asphaltum. This is done while hot. To cool and separate the particles, a mixture of 70 pts. sodium nitrate and 10 pts. anthracite are added. The dry mass is finally impregnated with from 1 to 3 per cent. of nitro-glycerine.

DYNAMIT ACTIEN GESELLSCHAFT, Hamburg: (Germ. P., No. 4410, July 2, 1878.)—*Swell cellulose* with sulphuric acid of from 40° to 49° B., or a concentrated solution of zinc chloride, for the purpose of *facilitating* the formation of *nitro-cellulose.*

HEINRICH PUTZ, Saxony: *Tanning with an alkaline solution of the keratine compounds.* (Germ. P., No. 4389, June 7, 1878.)

G. FOLEY, Montreal, Canada: (Engl. P., No. 1224, March 28, 1878.)—*Preserves tanning mixtures* by means of calcium bisulphide.

W. JOHNSTONE, Philadelphia: *Fire extinguisher.* (Engl. P., No. 1277, April 1, 1878.)—Equal quantities of potassium chlorate, rosin, potassium nitrate and peroxide of manganese, are moistened with liquid glass, and pressed into blocks. They are packed into boxes which are connected by fuses, and suspended at the ceilings of rooms.

TH. S. HUNTLEY and R. W. KESSEL, Cardiff: (Engl. P., No. 1919, May 14, 1878.)—*Plastic water-proof explosive*, consisting of 75 parts nitro-glycerine and 25 plaster of Paris.

DYNAMIT ACTIEN GESELLSCHAFT, Hamburg: (Germ. P., No. 5528, July 2, 1878.)—Small quantities of *camphor* (up to 10 per cent.) are added to *nitro-glycerine* to reduce its explosibility.

CH. E. SEYMOUR, Montreal: (Engl. P., No. 2046, May 22, 1878.) *Hardens leather* and makes it *water-proof* by saturation with a solution of rosin in petroleum.

E. E. FLOYD, Boston: *Artificial leather.* (Engl. P., No. 2018, May 20, 1878.) —Cotton goods or similar articles are repeatedly painted with a material produced by dissolving india rubber in naphtha, and the addition of certain quantities of shellac, zinc, white clay and gypsum. This is covered with a colored magnesium silicate layer, and then the whole is varnished and passed through rollers.

DYNAMIT ACTIEN GESELLSCHAFT, Hamburg: (Germ. P., No. 4829, Feb. 28, 1878.)—Add 10 per cent. gun cotton to nitro glycerine, to *reduce the explosibility.* Methyl alcohol, camphor and aceton may likewise be added, and to produce better combustion, also saltpetre and blasting powder.

ALEX. FORSYTH, Salford: (Engl. P., No. 2964, June 28, 1878.)—Adds 1 per cent. of oxide of silver to *lubricating* oils and fats.

PAT. MOIR, Crane, and GEORGE MOIR, Manchester: (Engl. P., No. 2769, July 10, 1878.)—Leave the paraffine in the heavy petroleum oils if they are to be used as *lubricators.*

E. VAN DER VELDE, London: (Engl. P., No. 1686, April 26, 1878.) *Preservation of food* by means of a concentrated solution of 100 parts sodium bicarbonate and 40 parts of sugar.

G. KUEHNEMANN, Dresden: (Germ. P., No. 4611, March 15, 1878.)—Treatment of the seeds of *gramineae for sugar, phytoleucomine and phytodermatiose.* This patent has especial reference to the treatment of barley for the above mentioned substances. To this end barley is first crushed and digested with lime water under constant agitation. A mucilaginous fluid is after some time drawn off. This deposits starch on standing. Carbonic acid and boiling precipitate then a brown albuminous substance. After evaporation, phosphoric acid or acid lime phosphate are added, which besides sinistrine precipitates some other substances, which in brewing produce oftentimes trouble. Neutralization with calcium carbonate remove these substances. The fluid contains now only phytoleucomine, and is then evaporated to syruppy consistency in a vacuum pan. The residue from the mucilaginous fluid, the utilization of which has just been described, is then treated yet by converting the starch into sugar. The lastly remaining cellulose is bleached with chlorine, and is advocated as being an excellent material for the manufacture of paper.

AUG. COLLINGRIDGE, London, and R. F. LECERF, Gravesend: (Engl. P., No. 1573, Apr. 18, 1878.)—Use the products of distillation from tea and other decoctions for the preparation of various *beverages*.

HEUSNER, Paris: *Lactoscope*. (French P., No. 116,329.)—Similar to the instrument proposed by Donne.

JOSEPH W. SWAN, Newcastle: Preparation of *opium free from narcotine*. (Germ. P., No. 6241, May 21, 1878.)—Narcotine is by this process extracted by means of a mixture of 8 parts chloroform and 1 part ether.

H. A. J. MANOURY, Capelle: *Tribasic lime saccharate*. (Germ. P., No. 5003, Nov. 1, 1878.)

ANTON ZENISEK and C. SCHMIDT, Dobrawic: *Manufacture of sugar*. (Engl. P., No. 1703, Apr. 27, 1878.)—The patent claims the use of hydrofluosilicic acid for the removal of the alkalies, and of tannic acid, at low temperature, for the removal of the albuminoids.

AUG. SEYFFERTH, Braunschweig: Preparation of crude *dry lime saccharate*. (Germ. P., No. 5723, Dec. 28, 1877.)

G. F. MEYER, Holzminden: *Uses sand for the filtration of sugar beet juice*. (Germ. P., No. 5633, Jan. 15, 1878.)

E. SCHRADER, Koenigsberg, and O. DUMCKE, Valmincken: *Coake-centrifugal filter*. (Germ. P., No. 5175, July 4th, 1878.)

CARL BOEGEL, Brieg: (Germ. P., No. 6203, Nov. 8, 1878.)—*Frees lime saccharate from salts and coloring matters*, with the aid of glycerine, which does not dissolve the saccharate. The glycerine is finally removed with water. The method may be used for quantitative determination or for working on a manufacturing scale.

H. KENYON, Warrington: (Engl. P., No. 2062, July 3, 1878.)—Adds, for the purpose of *purifying illuminating gas, saw dust saturated* with a concentrated solution of zinc chloride, to Laming's mixture.

F. JOHN EVANS, Brentford, and W. T. SUGG, London: *Manufacture of illuminating gas*. (Engl. P., No. 3445, Sept. 12, 1877.)—Use ammonia to remove sulphur compounds from the gas.

JAMES LIVESEY, London, and JAMES KIDD, Wandsworth, London: Apparatus for the manufacture of *water gas and carburetting the same*. (Germ. P., No. 2075, Feb. 1, 1878.)

WILL GENTELES, St. Helens: (Engl. P., No. 2224. June 3, 1878.)—Preparation of *ammonium chloride* by conducting the products of distillation from gas water in a solution of chloride of calcium.

C. W. HEATON, Lessness Heath: (Engl. P., No. 2231, June 4, 1878.)—Purification of illuminating gas by means of gas water finally divided by an "atomizer" arrangement.

A. W. WILKINSON, New York: *Regeneration of gas lime*. (Engl. P., No. 2916, June 24, 1878.)

W. MARCH JACKSON, Providence, R. I. : *New burner for illuminating gas.* (Germ. P., No. 4593, Aug. 17, 1878.)

G. J. MEURLIN, Stockholm: *Automatic gas regulator.* (Germ. P., No. 4703, Aug. 27, 1878.)—Between gas pipe and burner a vertical pipe is inserted, which contains a disk with an opening in the centre. A hollow cone is moved by the gas pressure towards this opening, closing it gradually with the increase of pressure. A small hole at the point of the cone prevents, that by too sudden increase of the pressure, the gas is extinguished by allowing a continual flow of the gas.

J. W. EICHLER and H. HARTIG, Stuttgart: *Automatic gas regulator.* (Germ. P., No. 9492, Nov. 6, 1878.)—The gas passes through a rubber balloon full of holes at its under end, which is inside of a glass cylinder. Too high pressure presses the rubber upon the glass, thus closing the holes.

LOUIS MORFF, Berlin: (Germ. P., No. 4473, July 23, 1878.)—Method for the *simultaneous lighting or extinguishing of gas lamps* by means of hydrogen phosphide or hydrogen gas. In the latter case platinum sponge aids the ignition.

W. KLINKERFUES, Goettingen: *Apparatus for lighting or extinguishing gas lanterns.* (Germ. P., No. 4390, July 2, 1878.)—Mechanical arrangement.

CARL SIEVERS & Co., Hamburg: *Gas burners for the purpose of heating.* (Germ. P., No. 5609, Nov. 23, 1878.)

F. A. JEAN BAPTISTE, Compte de Saintignon: *Pyrometer.* (Engl. P., No. 2409, June 17, 1878.)—Through the pipe which is designed to measure the temperature, a current of water or other fluid is passed with such rapidity of motion, that the fluid is not heated to its boiling point. By multiplying the rise of temperature observed in the fluid, with a constant figure, the heat of a furnace may at once be calculated. The apparatus of the inventor shows for each 33° temperature in the furnace, 1 degree rise of temperature in the fluid.

American Patents.

Condensed from the Official Gazette of the **U. S. Patent Office,** by ARNO BEHR.

July 1, 1879.

216,949.—*Blasting-powder.* CHAS. FELHOEN.

Ordinary gun powder mixed with nitro-naphthaline.

217,076.—*Manufacture of iodine and bromine.* JÉROME N. J. DUBREUIL.

Proposes to reduce the green sea-weeds to a pulp, to mix this with lime and press it. Iodine and bromine are precipitated from the solution.

July 8, 1879.

217,232.—*Processes for treating pyroxyline.* WM. MCCAINE.

A mixture of gun-cotton and spirits of turpentine.

217,235.—*Manufacture of bitartrate of potassa.* E. MULLER.

Pure cream of tartar is obtained by crystallizing it from a solution of the argols, to which hydrochloric acid has been added. The tartaric acid in solution is afterwards precipitated by addition of chalk.

217,288.—*Fruit and vegetable drier and bleacher.* GARRET W. HOPKINS.

A drying house with an arrangement for the introduction of sulphurous acid gas.

217,295.—*Manufacture of plumbago crucibles and other vessels, in plumbago suitable for chemical and metallurgical purposes.* SAMUEL A. PETO.

Brief: Forms a glaze consisting of two parts of cornish stone, four parts of burnt clay and one and a half part of red clay, ground and mixed with water, so as to form a creamy paste, one half part of manganese being added.

217,377.—*Revivifying spent lime.* G. R. HISLOP.

Proposes to desulphurize spent lime of gas-works, by passing hot furnace gases through it while in the purifiers.

217,418.—*Treatment of bone, vegetable ivory, etc.* G. HAND SMITH.

In a peculiar apparatus, bones or vegetable ivory are impregnated with gum or gum-rosin, so as to fill the pores with a transparent substance.

July 15, 1879.

217,448.—*Processes of treating vegetable fibrous substances.* WM. COURTENAY.

Waste paper, cotton rags, etc., are to be treated with sulphuric acid first, then with metallic chlorides. The material may be mixed with graphite, rosin and gums.

217,460.—*Manufacture of aluminous cake.* THOMAS S. HARRISON.

The claim is for *fibrous* aluminous cake as a new article of manufacture.

217,495.—*Manufacture of Bessemer steel.* SIDNEY G. THOMAS.

The process of dephosphorizing, by blowing the metal in a converter lined with lime, or a mixture of lime and iron ore, and continuing the blow one to six minutes after the disappearance of the carbon lines.

217,521.—*Processes for preparing yeast.* H. ZUM FELDE.

Air or other gases are blown through the mash in minute currents, in order to promote the growth and facilitate the collection of the yeast.

217,523.—*Preventing crystallization and blow holes in casting metals and the alloy.* THEODORE FLEITMANN.

The patent claims the addition of magnesium to molten metals, before casting generally, and the malleable nickel containing one half per cent. of magnesium in particular.

July 22, 1879.

217,705.—*Manufacture of ornamental buttons from blood and other materials.* WM. F. NILES.

Refers to a method of admixing coloring matter to the dried blood used in this manufacture.

217,779.—*Processes for preserving meats.* JAMES M. DILLON.

Brief: Dry salt is subjected to smoke generated in a closed retort until it becomes impregnated with the smoke evolved. This is then applied to the meat by the method known as "dry salting."

July 29, 1879.

217,896.—*Carboys.* F. NICHOLS.

The glass vessel is globular, and the aperture for the mouth is made without a projecting neck.

217,946.—*Alloys for journal bearings.* DAVID JACKSON.

The alloy consists of copper, 89.7; tin, 7.3; nickel, 2.5; antimony, 0.5 per cent.

217,962.—*Manufacture of steel.* SIDNEY G. THOMAS.

The patent is for a method of refining the metal first in a fixed Bessemer converter with a siliceous lining, and subsequently running it into a converter with a calcareous basic lining, and in the presence of calcareous basic additions.

217,981.—*Photo-mechanical printing.* LYMAN G. BIGELOW.

218,020.—*Processes for manufacturing glucose.* H. M. HARTSHORN.

By a mechanical process of grinding and sifting, the oil-containing parts of the corn are separated from those containing comparatively more starch. Only the latter portion is used for the conversion into glucose either by the malt or the sulphuric acid process.

218,066.—*Electric oil-testers.* G. M. SAYBOLT.

The flashing of the oil vapors is effected by electric sparks.

August 5, 1879.

218,137.—*Photo-mechanical printing.* TH. C. ROCHE.

218,231.—*Processes and apparatus for treating hops and malt extracts.* H. CLAUSEN, G. W. WUNDRAM and G. C. CLAUSEN.

Inventors boil the wort in a peculiarly constructed vacuum pan.

218,315.—*Manufacture of refractory bricks, crucibles, etc.* E. RILEY.

By mixing powdered anhydrous lime with petroleum, a paste is made, which is molded into bricks, furnace linings and the like, and then heated.

218,334–218,336.—SIDNEY G. THOMAS' *patents describing the manufacture of refractory basic bricks and furnace linings.*

The material to be used is a highly magnesian lime-stone containing 4–5 per cent. of alumina and about the same amount of silica. It may be used alone, or after burning, mixed with tar or mixed with a solution of silicate of soda.

August 12, 1879.

218,405.—*Linings of cupola, reverberatory, Bessemer and other furnaces used in the manufacture of iron and steel.* G. J. SNELUS.

Another patent for the use of lime, or lime and magnesia, for these purposes.

218,490.—*Artificial stone.* H. A. COMINS.

218,538.—*Compositions for walls and ornaments.* J. B. KING.

Clay, lava, dextrine, fibre, plumbago and glass

August 19, 1879.

218,659.—*Solutions for preserving timber.* E. BOUVIER.

The solution contains sulphate of copper and benzoic acid. The inventor proposes to let the living tree absorb it.

218,671.—*Manufacture of ethyl chloride.* J. F. GESNER.

It is produced by the action of hydrochloric acid gas on alcohol; the claims are for the arrangement of the apparatus.

218,676.—*Detergent compound.* CHAS. KAHN.

A solution of soap, borax, sal-soda, ammonia, alum and ammonium sesquicarbonate.

218,762.—*Explosive compounds.* A. MONNIER.

Consists of chlorate of potash, sugar, ground charcoal and coal-tar.

August 26, 1879.

218,933.—*Compounds for the purification of gas* J. STORER CONNELLY.

Iron sponge alone or mixed with iron borings, and oxidized, hydrate of lime and sawdust, the whole saturated with lime water.

219,004.—*Manufacture of iodine and bromine.* R. MUELLER and H. BOECKEL.

The liquid containing bromine or iodine compounds, flows continuously in a finely-divided and heated state through a coke-tower at the lower end of which chlorine gas is introduced. The vapors of iodine and bromine escaping at the top, pass into a condenser.

219,056.—*Batteries.* P. JABLOCHKOFF.

Fused nitrates constitute the positive pole, and carbonaceous matter the negative pole.

MISCELLANEOUS.

In a few of the last numbers of the *Berichte der deutschen chemischen Gesellschaft*, a series of articles have been published, which promise to become of uncommon interest.

The authors, Victor Meyer and Carl Meyer, describe in vols. **11**, 1868; **11**, 2253, and **12**, 1426, an apparatus for the easy determination of the specific gravity of gases at high temperatures, and give in an elaborate manner proofs of the general applicability of the method proposed, and finally show, that if chlorine be heated above about 800° C., a dissociation commences, which results in a gas having merely $\frac{2}{3}$ the specific gravity of the common chlorine gas.

What becomes of chlorine exactly, when such dissociation takes place, has so far not been described, but the authors' theories point either to a possibility that ordinary chlorine gas may be composed of three atoms united to one molecule in the manner in which ozone is theoretically considered, or to one probably leading to Guy Lussac's murium, a theoretical compound apparently a long time ago disposed of. They have promised further to test such dissociated chlorine by dialysis, and thus determine whether substances not chlorine can be separated from the gas.

According to a short notice in the *Chemical News*, apparently based upon private communication, the authors have succeeded in thus separating oxygen gas from dissociated chlorine. This would directly point to the murium theory.

These articles will appear in a connected form in the next number, when it is hoped authentic details can be given of the results obtained by the authors to date. H. E.

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